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COMMISSION, 1901-

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BENGAL.

INDIAN IRRIGATION COMMISSION.



MINUTES OF EVIDENCE.

THE IRRIGATION COMMISSION OF 1901-02.

BENGAL.

COLONEL SIR COLIN SCOTT-MONCRIEFF, K.C.M.G., C.S.I. (*President*).

Mr. J. W. P. MUIR-MACKENZIE, I.C.S.
Sir THOMAS HIGHAM, K.C.I.E.

Dewan Bahadur P. RAJARATNA MUDALIAR, C.I.E.
Mr C. G. H. ALLEN, I.C.S. (*Temporary Member
for Bengal*).

Mr. W. B. GORDON (*Secretary*).

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FIRST DAY.

Bankipore, 24th October 1902.

WITNESS No. 1.—MR. J. G. CUMMING, Collector, Patna.

1. Q. (*The President*).—You are Collector of Patna, I understand?—Yes.

2. Q. How long have you been here?—1½ years.

3. Q. Where were you before that?—I have been in Bhagalpore and Eastern Bengal; in the early part of my service I was in North Bihar.

4. Q. Have you ever had anything to do with the famine question?—No, except for a very short time in the Midnapore District.

5. Q. You say in your memorandum in reply to question No. 3 with regard to the character of the soil in Bihar "heavy soil on the whole; much of it cotton soil suited to the river system of irrigation." What is this exactly; is it black cotton soil, as it is elsewhere in India?—It is locally known as cotton soil; it is very friable, boggy in the rains and cracks in the dry weather.

6. Q. Is it black?—Some of it is black; a portion of it is light in colour.

7. Q. You say "it is suited to the river system of irrigation." What do you mean by that system?—I mean the system of irrigation in the Bihar Sub-division where water is collected in these reservoirs.

8. Q. I presume it is called cotton soil, because it is suitable for the growth of the crop?—I am not aware of that. It is simply a local name.

9. Q. Does it take irrigation?—I do not know enough about that to say.

10. Q. (*Mr. Muir-Mackenzie*).—I understand that this soil that you call cotton soil is, as a matter of fact, irrigated, is it not?—Yes, it is irrigated.

11. Q. Whether it is the same as in other parts of India and proves refractory to irrigation you are unable to say?—Yes.

12. Q. (*The President*).—In answer to question No. 7 you use the term *nachhatra*; what is that?—That is, more or less, a fortnight.

13. Q. You say in answer to question No. 9 "no special measures are required for private works, as the zamindars themselves keep their *bunds* in order." Is that general? Are there any complaints on the subject?—In the Bihar Sub-division there are no complaints. The *bhaoli* system is in force there, and it is to the interest of the landlord to keep up the supply of irrigation.

14. Q. The *bhaoli* system is payment of the tenant in kind?—Yes.

15. Q. A proportion, not a fixed quantity?—There are varying arrangements according to which it is paid; sometimes according to proportion; sometimes by previous assessment.

16. Q. It is all called *bhaoli*?—Yes, it is a general term for payment in kind.

17. Q. (*Mr. Muir-Mackenzie*).—Sometimes the tenant pays so many maunds?—Yes, in some cases after it has been settled what the proposed result will be.

18. Q. (*Mr. Allen*).—It is called by different names?—Yes.

19. Q. (*The President*).—You say in answer to question No. 8—"As for Bihar, the whole sub-division is most keenly alive to the conservation of water, not simply for the increase of produce, but for getting any produce at all." Where do they get their water from now; the Sone Canal or where?—Bihar is entirely watered by rivers that flow from the Gya District, with a northerly and easterly trend; from the rivers *pains* are taken and then reservoirs are constructed; from these reservoirs separate channels lead to the fields.

20. Q. When you talk about zamindars keeping the *bunds* in order, do you mean *bunds* across the rivers?—I allude to *bunds* of reservoirs, not of rivers.

21. Q. Who makes the *bunds*?—Zamindars.

22. Q. Is that done satisfactorily generally?—I cannot say; the only way we are concerned with it is that it is a source of constant quarrels between the neighbouring zamindars.

23. Q. Do you consider there is any necessity for legislation on the subject, in order to prevent these disputes?—It is very difficult for me to say.

24. Q. You have not been long here, I recognize that?—I certainly think it would be a good thing if the Collector had the power to interfere at the beginning if he thought it proper to do so; and when he thought he could settle a dispute which otherwise meant years of litigation.

25. Q. Has any zamindar the right to put a *bund* across a stream to divert water into his channel?—At present nothing new is done; it is laid down by prescriptive custom or decree of the High Court; every *bund* has a decree of the High Court about it.

26. Q. I didn't know whether there was a fixed number of *bunds*?—The number now is fixed. Any change at the present moment would be resented by every body.

27. Q. It must be a very rough-and-ready system as regards the proportion of water for distribution?—Yes, that is my impression.

28. Q. Are *bunds* made right across the rivers or are they merely directing groynes? I don't understand if the river is *bunded* right across again and again?—Usually they have a small channel which takes the overflow to the lower reaches; in some places the *bund* of a small river is stopped up entirely.

29. Q. You say in reply to the same question—"But I would recommend a thorough survey and examination of the scheme for a large reservoir at Ghora Katora on the south of Bihar, whereby the natural drainage from the Gya range of hills could be utilized." Has this reservoir scheme been gone into at all?—It is at the extreme end of the range of hills in the Gya District, and about three years ago was examined by way of reconnaissance, after which it was proposed that a proper survey should be made; the then Collector has since left the district and left no note about it. I discovered it quite by accident, and on looking up the papers found that it was proposed to irrigate 300 acres at a cost of Rs. 12,000; it could have been let out at a rate of Rs. 5 per bigha. At present it is all scrub and jungle.

30. Q. It is a small scheme?—Yes, quite small.

(*Mr. Allen*).—For irrigating a Government estate.

31. Q. (*The President*).—I suppose you would say as regards famine that your district is immune? Famine is not to be provided for to any great extent?—That is correct as a general statement. The South Bihar Sub-division is akin to the Gya District, and there are parts for which in past years a good deal of anxiety has been felt; the rest of the district is either on the bank of the Ganges or is commanded by the Sone Canal system. The district is practically immune from serious famine.

32. Q. Do the lands commanded by the Sone Canal system fetch a larger price than others?—I have no particular knowledge on the subject.

33. Q. Has the fact of steady, constant irrigation raised the quality of rice in those districts. We have heard in some places that a distinctly superior style of crop was grown?—The irrigated rice is very fine, but I cannot say how far it has improved.

34. Q. Have you any complaint of the mischief done by canal water, comparing the irrigation done by the Sone Canal with the irrigation by *ahars* or wells? The reason I ask is that Mr. Tytler, formerly of the Opium Department, says in a note—"Canal water is chiefly good for paddy, for which crop, however, it is, if irrigation is required, a necessity, as it floods the land, and paddy

Mr. J. G. Cumming.

24 Oct. 02.

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thrives standing in water. For most other descriptions of crops it is more or less injurious, while the harm it does is progressive, increasing each year the water is used." And further on he says—"Lastly, comes canal water, which for cereals and for the soil is harmful, because it is colder than the atmosphere, and so far as I know is devoid of fertilising properties owing to its pureness." Have you heard anything about this?—No.

35. Q. You say in reply to question No. 11 that "well-cultivation is largely practised in the higher land for poppy and vegetables. Especially it is noticeable in the potato-growing area in the neighbourhood of Patna." I suppose rice is never grown under wells?—I think not.

36. Q. The greater part of your district is rice; it is hardly worth taking into account other crops?—All along the bank of the Ganges rice is the least important.

37. Q. What other crops are there?—On the banks of the Ganges they depend in the early spring, the *rabi*, crop. They also have a very good *bhadoi*.

38. Q. Would they merely water from the overflow of the river?—Immediately to the south of the East Indian Railway line is a large tract which is flooded almost every year; that grows an excellent crop of *rabi*.

39. Q. It does not require wells?—No.

40. Q. Are there any *takavi* advances given for wells?—There is no demand for wells. I have tried to push advances, but there is no demand.

41. Q. You say in reply to the last question—"I believe in offering joint advances to villages when they are hard pushed for water, in order to construct many temporary *kachcha* wells, but permanent wells must be left to the foresight of the zamindars or of the Local or District Board." Does the Local or District Board take an interest in irrigation matters?—No, not in wells for irrigation.

42. Q. Are these wells mostly for village purposes?—Yes.

43. Q. (Mr. Muir-Mackenzie).—You say in reply to question 5A "there is no record of a serious famine within the last 25 years." Is there any record of a previous famine?—I cannot find any.

44. Q. Has a record-of-rights been introduced into the Patna District yet?—No.

45. Q. You say there were these disputes about the management of the *pains*. Do you think the record-of-rights in water might profitably be introduced at the same time as the record-of-rights in land?—Yes. It would be a good thing to record the decisions as regards rights in water.

46. Q. Could that be done without legislation?—That is difficult for me to say. If I was a Settlement Officer, I would certainly do it.

47. Q. You have been Settlement Officer?—Yes.

48. Has it ever been your practice to record rights of water?—No, because the case did not arise.

49. Q. You say that the management of these *bunds* lead to disputes; if they have gone to the High Court for every important *bund*, what is there that remains to be disputed over?—They won't respect the High Court's ruling. At the present time I have got a special police force in three villages.

50. Q. The special force is necessary to enforce the High Court ruling?—Yes.

51. Q. Having regard to the existing amount of irrigation in these parts of the district, which are not served by the Sone Canal, is there much room for extension?—In the Bihar Sub-division, as far as my experience goes, I think we have done all that there is to be done.

52. Q. You don't think it would be worth while surveying the country to see if anything more could be done?—Certainly not.

53. Q. You don't think by a liberal provision of *takavi* that much extension would result?—I think not.

54. (The President).—Have you got any famine works programmes?—We have no more than provision for the raising and repairing of existing roads.

55. Q. Is the District Engineer responsible for that?—It is he who has prepared this.

56. Q. Is it kept up to date?—I have brought it up to date at the present time.

WITNESS No. 2.—MR. RAM ANUGRAH NARAYAN SINGH, Deputy Collector, Patna.

Mr. Ram Anugrah Narayan Singh.
24 Oct. 02.

Note on legislative measures for interference of the Collector in the matter of irrigation disputes and imposition of irrigation cess.

I agree with Mr. Oldham that to prevent disputes and breaches of the peace in the matter of irrigation disputes and in the interests of poorer and weaker landlords, the Collector's interference would be necessary. The richer zamindars as well as poorer zamindars would welcome the decision of the Collector who knows all about his district. His decision will be obtained at once and without cost and save them the law's delays and ruinous costs. The payment of small cess by lands protected by the canals and water-works and benefitted by them will not be grudged gradually, though there may be some pinch felt in the beginning. In a year of drought the gratitude must be acknowledged and payments of other years well recouped.

Note on Karamnassa-Bhabua Irrigation Water Scheme.

From what I know of Bhabua and the adjacent tracts of lands in Sasaram and United Provinces, I am very confident of the success of the scheme to catch the surplus water of the Karamnassa into a big reservoir or small reservoirs as may be decided upon professionally by skilled engineers. There is a very large tract of land which is lying waste and which can be converted into good paddy-producing tracts by means of irrigation from the artificial lake or small reservoirs.

I cannot speak with the same amount of certainty as regards other schemes.

Note on the Queries of the Irrigation Commission.

1. In my capacity as Deputy Collector and Magistrate I know the districts of Saran, Gaya (including the Sub-divisions of Aurangabad), Shahabad (with the Sub-divisions of Sasaram and Bhabua), Champaran, Darbhanga and Patna where I hold landed property.

2. It is manifest to every one interested in land—landlords, farmers, tenure-holders and tenants—that the canals and the village irrigation works consisting of water reser-

voirs, with conduits and other sorts of village channels, are great protection against famine.

3. The districts of the Patna Division to the south of the River Ganges, viz., Patna, Shahabad and Gaya, are fortunate to have the Sone Canals besides a net-work of village irrigation channels, and so they are less liable to feel the pinch of famine and scarcity, except in portions of tracts where these facilities do not exist.

4. (Q. 1.) Answered by District Officers.

5. (Q. 2.) High lands (hilly and *jungli* lands) where irrigation is not possible on account of non-existence of wells or water-courses are liable to famine or scarcity.

6. (Q. 3.) The circumstances vary in different districts generally; the *keotal* soil is suitable for paddy and wheat and the sandy soil is for *bhadoi* and *rabi* crops.

7. (Q. 4.) Generally on wells and upon the supply of water in the water-courses (dependent on rainfall) and upon the maintenance of the dams and banks of reservoirs.

8. (Q. 5.) Charts furnished by District Officers.

9. (Q. 6.) General answer.

Soil.	Crop.	When sown.	When reaped.
Lowland	Rice	June—July.	November—December.
Highland	{ <i>Bhadoi</i> , maize.	May—June.	September—October.
Both	{ <i>Rabi</i> , wheat, gram.	November—December.	March—April.

10. (Q. 7.) General answer.

Bhadoi crops (maize—Fwd), etc., from May to September.

Kodo—Periodical showers, May to September.

Aghani rice—Every *nachchatra*.

(Shewn in table accompanying this note shewing agricultural operations in the year) except one from May to September.

Poppy—Continuous irrigation in October, November and December.

Wheat—Light showers from October to January.

Rabi crops—Rain wanted in September, October and December.

Sugarcane—Specially in April, May and June.

11. (Q. 8.)—*General.*

Irrigation, as at present carried out by local zamindars, is premature and in places dangerous to roads and railways. If the damming of streams in undulating country, reservoirs in hill tracts and minor canal schemes were carried out on engineering principles, they would be extremely beneficial and would avert to a great extent famines in future.

12. (Q. 9.) The District Boards might take over larger irrigation works in villages. Government may appoint a Special Irrigation Engineer to advise the Local District Engineer. Works of ordinary nature would, in most cases, be carried out by local rich landlords. Where poorer zamindars are concerned, a grant-in-aid by Government or District Board should suffice.

13. (Q. 10.) *Ahars* or reservoirs are made in the undulating country by raising embankments on three sides, the high side requiring none. Rain water is caught in these reservoirs and carried to fields by means of conduits or village channels. These reservoirs are constructed and controlled by zamindars. The small embankments often collapse when rainfall is heavy, especially when repairs are neglected. They are very premature in their make and sometimes source of great danger to roads and susceptible of great improvement. If made on engineering principles, they would be less expensive to the zamindar in the long run and prove works of great utility.

(Q. 10a.) Reservoirs belong solely to zamindars, and no assistance is granted from Government.

(Q. 10b.) No concession is given for construction of water reservoirs by zamindars.

(Q. 10c.) Obstacles to extension of water-works.

(1) Want of knowledge as to the best means of utilising the water in the rivers, streams, etc., in the country.

(2) Want of assistance on behalf of Government.

(3) Want of means.

(4) Want of combination among local zamindars owing to after dispute or to the partition of water.

(Q. 10d.) No restriction of any kind is imposed by Government in the matter of the construction of new works. Streams are dammed haphazard, causing jealousies and often disputes between zamindars, which involve them in expensive law-suits.

14. (Q. 11.) *General.*

Well cultivation is used in higher lands for poppy and vegetables.

(Q. 11a.) The average depth of water varies very much. Generally it may be put down as 40 to 50 feet in the dry weather.

(Q. 11b.) *Kachcha* wells cost about Rs. 5 or Rs. 6. Good wells would cost about Rs. 100.

(Q. 11c.) About 2 acres is the area commanded by one *lover*.

(Q. 11d.) In very dry weather the water level is very much lower in wells than in other seasons, so the difficulty of keeping the water free for use increases. Good *pakka* wells do not dry up.

(Q. 11e.) The Opium Department makes advances for construction of new wells.

(Q. 11f.) It is desirable to stimulate the construction of new wells by more liberal advances or inducements.

Mr. Ram
Anugrah
Narayan
Singh.

24 Oct. 02.

MINUTES OF EVIDENCE.

1. Q. (*The President*).—You are Deputy Collector?—Yes.
2. Q. Of what district?—I was in Patna. I am under orders to go to Muzaffarpur.
3. Q. You say in your note "I know the districts of Saran, Gya (including the Sub-divisions of Aurangabad), Shahabad (with the Sub-divisions of Sasaram and Bhabua), Champaran, Darbhanga and Patna." In fact, you know the whole of this Division?—Yes, except Muzaffarpur.
4. Q. Have you come across famine?—Yes.
5. Q. When was that?—In 1873-1874.
6. Q. When Sir Richard Temple was Lieutenant-Governor?—Yes.
7. Q. If the Sone Canals had more water than they have would there be an increase of irrigation? Is there enough for the wants of Patna?—We want more distributaries.
8. Q. Would the people take the water?—Yes, where the distributaries reach the fields.
9. Q. If there was double the present amount of water would there be double the area of irrigation?—Yes.
10. Q. Are you aware of any bad effects produced by this irrigation?—The canal water is very beneficial for paddy, but for *rabi* it is too cold.
11. Q. Are these cereals not irrigated?—There is no extension of well irrigation. They depend on the dews of the winter months.
12. Q. You heard Mr. Cumming's evidence just now; is there anything you would add to it in connection with disputes?—I have only to say that all cases do not go to the High Court; only the rich zamindars can take them up; the poorer zamindars cannot go in for civil litigation; it is very expensive, and they would hail with delight the appointment of the Collector to decide disputes.
13. Q. You think some legislation would be of value?—Yes. I have read with interest a paper by Mr. Oldham, Collector of Gya, and I know that several cases came before me where the poorer zamindars did suffer from the action of the richer.
14. Q. (*Sir Thomas Higham*).—Are you speaking of Government canals?—No, private irrigation, embankments, *pains*, etc.
15. Q. (*The President*).—Is land more valuable on the Sone Canals than elsewhere?—The growth of paddy is assured just where the Sone Canal passes, and so the value has increased; that was not the case prior to the existence of the Sone Canal.
16. Q. It is an insurance against unfavourable seasons?—Yes, exactly.
17. Q. You are aware that the canals have not returned much revenue to Government?—Yes.
18. Q. Supposing there are cases where canals are made by Government to afford protection against famine or loss of crop, but which would not be directly remunerative, take, for instance, a district like Bhabua Sub-division which suffers periodically, would the people there accept a cess as a sort of insurance in a year of drought?—In the first year or so it would not be liked, but in the long run it would be. In Bhabua there is a large tract of land that you could convert into paddy fields; if water is extended to that, the people will not begrudge a water cess.
19. Q. You say in reply to question No. 9 "the District Boards might take over larger irrigation works in villages. Government may appoint a special Irrigation Engineer to advise the Local District Engineer." Do you mean for purely small local works?—Yes, on account of ignorance on the part of the people, dams are put up haphazard which do considerable harm. An uninterested party should give professional advice as to where to put a dam, so that everyone would be benefited.
20. Q. Would the zamindars accept the decision of the District Board in that matter?—They will accept the decision of the Collector. In Bihar he is always the Chairman of the District Board.
21. Q. Do you think District Boards might be induced to take more interest in irrigation?—They ought to, and I think they will.
22. Q. I suppose these rivers which go from the Gya hills must be very often silted up; is the silt cleared out by anyone?—No; the old beds and water-courses are cleared out by the zamindars where they receive rents in kind.
23. Q. I suppose sometimes zamindars further down the stream suffer?—Yes.
24. Q. Could District Boards interfere usefully in a case of that kind?—Yes.
25. Q. (*Sir Thomas Higham*).—You propose these minor irrigation works be taken over by District Boards. Do the District Boards in Bengal have irrigation works belonging to them?—Not at present.
26. Q. (*The President*).—Mr. Allen explains that the District Boards are precluded from interfering in irrigation matters, as funds are all ear-marked and there is no surplus.
27. Q. (*Sir Thomas Higham*).—Where would the district get the money from?—They have to levy a cess for the maintenance of roads.
28. Q. That would not apply to irrigation works?—We want special legislation.
29. Q. In that case do you think the District Boards would be the proper agency?—Yes, at present they manage not only roads, but dispensaries, schools, etc.
30. Q. Have District Boards to do with irrigation works?—Not at present.
31. Q. Would not the money obtained from the cess go to benefit only a very few individuals?—Not necessarily; they maintain all the roads.
32. Q. I want to know where they are to get the money?—They realize certain cesses by which they maintain roads, dispensaries, schools, etc.
33. Q. But your irrigation works will be for the benefit of a few zamindars, not for the benefit of the district as a whole?—There will be better crops.
34. Q. You propose to cess the whole district for the benefit of a few?—What I intend is for the benefit of those protected.
35. Q. Out of the proceeds of the cess you propose to make the works?—Yes.
36. Q. You think there will be no difficulty in introducing a cess of that kind?—No, the persons benefitted would pay.
37. Q. That would require legislation?—Yes.
38. Q. You say no restriction is imposed in constructing new *bunds*?—No, the zamindar can construct a *bund* wherever he likes.
39. Q. If he cuts off the supply from people lower down?—Then he is prosecuted criminally under the Indian Penal Code.
40. Q. Is that not sufficient?—That is merely the thin end of the wedge; litigation goes on and costs lakhs and lakhs. If the Collector has the power to interfere, he would go to the spot and settle disputes; the people would hail with delight such a change of law. It would be beneficial to the poor.
41. Q. Would you propose that no one should be allowed to obstruct the stream without the permission of the Collector?—The Collector should have the power of interference.
42. Q. Will that not be after the mischief is done?—A zamindar knows when his rival is going to put up a dam, and he would at once go to the Collector and settle the matter. The Collector just now has not the power to do anything, except to issue an executive order to prevent a breach of the peace.
43. Q. (*Mr. Muir-Mackenzie*).—Do you think that irrigation is capable of much extension in the tracts with which you are acquainted?—Yes.
44. Q. In which particularly?—In the Bhabua Sub-division of Patna.
45. Q. Do you think irrigation could be much extended with advantage in Patna?—Yes.
46. Q. Mr. Cumming, the Collector, said just now he did not think it could; that all had been done that could be done?—He spoke of another part.
47. Q. Could it be done by private effort, if money were advanced to the zamindars?—Yes, I think so.
48. Q. You think they would be glad to take *takavi*?—Yes.
49. Q. Do you think the machinery for advancing money is satisfactory?—No.
50. Q. Why do you think it is not?—I think those who wish to give advances should go to the Mofussil and on the

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spot pay the people either in cash or by cheque whichever was convenient.

51. Q. At present a man has some difficulty in getting an advance?—Yes.

52. Q. He has to go to the Collector's office?—Yes.

53. Q. And very often that is at a considerable distance?—Yes.

54. Q. So that considerable delay results in his getting the money?—Yes.

55. Q. Do you think the rate of interest requires reduction?—No.

56. Q. (Mr. Rajaratna Mudaliar.)—The rate of interest is 6½ per cent.?—Yes, that is fair.

57. Q. (Mr. Muir-Mackenzie.)—Is there room for extension of well irrigation?—Yes.

58. Q. Where in the Patna District?—My answer would apply to the six districts in which I have been. There is a great deal of room.

59. Q. What prevents it extending now?—Want of money; want of enterprise; want of knowledge.

60. Q. Is want of capital the reason why irrigation does not extend?—Yes, that is one reason.

61. Q. The President asked you whether a cess would be cheerfully acquiesced in if irrigation works were introduced. I don't think the President meant a general water-rate or cess on the land; there would be no objection to such a cess?—No, not on the land that benefitted.

62. Q. Would they be willing to pay revenue even in a year when they did not require water?—Yes, because prices would be raised in a famine year.

63. Q. With regard to the management by District Boards of irrigation works, you don't think that would occasion a certain amount of delay?—Not necessarily. In case of emergency the District Board can pass orders in anticipation of sanction.

64. Q. Is not the action of the District Boards merely the action of the Collector?—Not now.

65. Q. Is an intelligent interest very general?—Now it is becoming very general in Bengal.

66. Q. (Mr. Rajaratna Mudaliar.)—In the Punjab we had evidence that the District Board management was a failure. What reason have you for believing that the Board management will be better in these provinces?—I am not aware of the state of affairs in the Punjab. I am humbly of opinion that the people take more interest in their affairs here, and if they get a good Collector, the measure will be hailed with delight.

67. Q. Will they have the time to do it; they have dispensaries, schools, etc., already?—Yes, plenty.

68. Q. Under your permanent settlement what scope is there for interference by the District Board?—The District Boards have already interfered by imposing a cess for roads.

69. Q. I don't yet understand what scope there is for interference by the District Boards?—I am also a zamindar myself; I am not speaking as a Government officer. I myself would not countenance the interference of Government in the imposition of a road cess. The same way when the zamindars find they are benefitted by protective irrigation works I don't think they will begrudge the amount of cess payable for the land protected or benefitted. Where I receive rents in kind I would willingly pay myself; where I receive them in cash I would demur.

70. Q. In what way would the interference of the District Board be beneficial to the zamindar?—At present a man may construct a dam and prevent those further down from

benefitting. If the Collector has to decide where to construct the dam, he will place it where both A and B can benefit.

71. Q. Cannot the zamindar himself do it in negotiation with the riparian rayats?—There will be jealousies and brawls.

72. Q. Do you think the District Board will be able to manage without some increase of establishment?—That is a large question.

73. Q. In some of the papers we have found that rayats do not take water even if the canal is there. Has that ever happened in the course of your experience?—Very rarely. Water is often taken clandestinely and the irrigation not shown in the returns.

74. Q. Water is taken and not paid for?—Yes.

75. Q. Is that carried on to a very large extent?—No.

76. Q. Have you any agency for efficient supervision?—Yes, but it is done clandestinely.

77. Q. Under your system the measurement and assessment on irrigated land is done by canal officers. Do you think it would be more efficient if that were transferred to the Revenue Department?—I agree with you that it would be more efficient.

78. Q. Would it be cheaper?—I think it would.

79. Q. With regard to the construction of wells and reservoirs, is there much scope for it in the districts in which you have served?—Yes, very much.

80. Q. Are there any facilities for zamindars or tenants to construct these works?—No.

81. Q. What facilities would you offer?—I would make advances.

82. Q. Is there any difficulty on the part of the zamindar in levying increased rent if he constructs a reservoir?—Very many; he goes to law; I am also a Government officer, and the less I say of the Bengal Tenancy Act the better.

83. Q. If the law were amended?—Then with great delight the zamindars would pay as many cesses as you like.

84. Q. Can an occupancy tenant construct a reservoir on his own estate?—Yes.

85. Q. The zamindar cannot come down upon him and fleece him?—No.

86. Q. As regards *takavi*, can you not take money with you and disburse it even now as the system exists?—There is nothing against it.

87. Q. You can draw bills and take a few hundred rupees; fresh legislation is not required for that purpose?—No.

88. Q. (Mr. Allen.)—You know Bhabua Sub-division?—Yes.

89. Q. And you know the area in Shahabad irrigated from the Sone Canal. Can you compare the area before it was irrigated with Bhabua?—I don't remember what the area was like before irrigation.

90. Q. Is it your opinion from what you know of Bhabua that people would take water if it was provided?—Yes.

91. Q. Why?—I have seen in other places where irrigation works have been started and facilities given that they take water.

92. Q. Do you think water is badly needed there?—Yes, if you get water from Karmannassa people will take it.

93. Q. Would they be willing to pay a water-rate similar to that now made on the Sone Canal?—Yes.

WITNESS No. 3.—MR. E. MYLNE, Zamindar, Shahabad.

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1. Q. (The President.)—You have got great experience of this part of the country. You have known it for a number of years?—Yes. Since 1872.

2. Q. You have seen the whole rise and growth of the Sone Canal?—Yes. I have seen the benefits also.

3. Q. And you know the Bhabua Sub-division?—Yes, I know it very well.

4. Q. You made a proposition as regards the irrigation of rice from five weirs?—Yes, that was in the year 1897 when we had famine.

5. Q. There was a note of Mr. Buckley's on the subject. I dare say you know all about it?—Yes. I know all about it.

6. Q. Have you any personal knowledge of the proposal for a big reservoir on the Karmannassa?—The proposal was made some years ago, about 1897, when I had charge of a large number of villages in the place. It was about 1897 when the people there were famine-stricken, and it was then that many zamindars came forward and begged me to see if we could not by some means or another make use of the water running to waste; and seeing that the people there were, practically speaking, destitute, and seeing that the water was going waste, the natural feeling was that something should be done.

7. Q. You must have known Mr. Levinge very well?—Yes.

8. Q. Do you remember his talking about this big reservoir?—Yes.

9. Q. The scheme, as far as I understand it, has not been thoroughly gone into scientifically?—What is the use? We do not know what water is really available.

10. Q. And, as I understand, the crucial time is the watering from the 20th September to the 20th of October in the *katia*?—If you don't get water, then, practically speaking, work is useless, because one irrigation now brings the rice on when it is in the ear; and if we have no water now, then, practically speaking, rice from being 16 annas may run down to 4 annas.

11. Q. So that any irrigation scheme to be useful must give water in the *katia*?—That is a *sine qua non*.

12. Q. I understand that in your particular Sub-division (Bhabua) that supply is deficient?—Practically speaking, there is no irrigation there; the rayats are miserably poor, and the estates are subdivided among so many zamindars, and some of them are so involved that there is no incentive for them to do anything.

13. Q. Bhabua is the same as the Sone tract was before 1878?—Precisely the same.

14. Q. Is there any well irrigation?—Rayats have no money for well irrigation.

15. Q. Is rice irrigated on wells?—No. Well, you may do it. A strong rayat does it.

16. Q. Is the country now a paddy country?—Bhabua is a country that will grow anything. It is very fine soil.

17. Q. Having this uncertainty about water, do the inhabitants turn to anything else?—What can they turn to? They are practically agriculturists, and there are large areas lying fallow simply for want of irrigation.

18. Q. Would it not be easy to devise a system of giving *takari* advances to help them to make wells?—Well, the question is that in one village there may be 20 landholders, and which of them are you going to advance to? Then again another difficulty about advance is that there is no security. The rayats are in such a miserable condition that no *banias* will advance them money.

19. Q. Are there no big zamindars?—There are, practically speaking, four big zamindars, who own from 50 to 100 villages. Then again the Maharaja of Benares has estates there. It was he who was on the point of bunding the Karamnasa at his own cost, and we heard of that and reported the matter to Mr. Bourdillon, and said that if that were done, Shahabad would not get water. Thereupon he wrote to the Commissioner of Benares. There must have been something in it, if a man like Benares would risk his money on it.

20. Q. Supposing we are told that the Karamnasa scheme is too expensive and is impracticable, why should not there be extensive well irrigation?—The *bhaoli* system prevents this. The tenants will not make 20 maunds per *bigha* if they can help it, because half will go to the zamindar.

21. Q. Would zamindars take *takari* advances?—There is no incentive for the zamindar under Act 10 of 1885 to make any improvements, because, practically speaking, enhancement has ceased. It is hedged round with such great difficulties that no zamindar will go in for improvements, because he knows there will be no return, and yet improvements are possible.

22. Q. It seems to be a curious deadlock if improvements are possible, and yet it does not pay any person to make them?—It pays a rayat if he is perfectly sound in his tenure.

23. Q. If he is a permanent rayat, would he take a *takari* advance?—Possibly he may, but then you see he has got to go to the Collector.

24. Q. I am supposing that the Collector goes to him?—Then it might suit him to do so.

25. Q. You are quite well aware that large areas in India are irrigated by wells?—Possibly, but you see where you may lay on canal water, wells cease.

26. Q. To go back to the Karamnasa scheme, I should like to know whether you think that any water stored there would be gladly availed of?—No doubt.

27. Q. And would it be taken every year?—Yes, as in the Sone Canal.

28. Q. We have found in other places that seven years out of ten nobody wants the water?—That has not been my experience in Shahabad, and that has been since 1872. Before that the area was then only limited; now it has been increased by the volume of water.

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29. Q. (Mr. Muir-Mackenzie.)—You find the water useful every year practically?—Yes.

30. Q. (The President.)—Has there been any serious charge brought against the irrigation of Shahabad? I mean has fever been produced by it?—No, I don't think so.

31. Q. There was a notion that irrigation had increased the feverishness of the district?—That has not been my experience. The sub-soil drainage here is very good; and if you go down 10 or 12 or 15 feet, you get into pebbly sand, and there is no case of water-logging that I know of. The drainage is very good.

32. Q. Have you any suggestions to make for the improvement of the administration?—No. I think things are working very smoothly. I don't think we can do any better.

33. Q. Is navigation very valuable to the district?—I don't think so. I think it was a mistake to have made these canals navigable at all. It was a mistake in the beginning, but we all make mistakes.

34. Q. Even before the railway was introduced, navigation was not doing much service?—I don't think it amounted to much. Now that we have this other railway, the Gya-Mogulcerai Railway, navigation is still less required. I don't think the canals, as far as navigation goes, pay in the district.

35. Q. (Mr. Muir-Mackenzie.)—I understand you to say that the *bhaoli* tenure sets an obstacle to the undertaking of improvements by the rayat?—Yes, most distinctly.

36. Q. I don't quite understand why with the *bhaoli* tenure there is no incentive to improvement by the zamindar. He will get an enhanced share of produce?—Yes, the zamindar makes the improvement, but it rests with the rayat whether he will turn out a good crop or not, so that he is at the mercy of the rayat.

37. Q. And the rayat will not make proper use of the improvement?—No.

38. Q. On the other hand, with the *naidi* system you think the rayat will have some incentive to improvement?—Yes, provided he is an occupancy rayat.

39. Q. And the zamindar will not?—Certainly not. The Tenancy Act has stopped enhancement.

40. Q. There is one provision in the Tenancy Act by which, if an improvement is made by the landlord, and at his expense, he is allowed to enhance the rent?—I think it is about 10 per cent. It is not very much. It is a very small enhancement. I am not sure, but I think it is about that. The incentive to the zamindar is so little that I think I am right in saying that no zamindar will spend money in improving the status of the rayat.

41. Q. Then you consider that the Tenancy Act, even with that provision, has not enabled the zamindar to take enhancements?—No. It is so hedged with difficulties. You have got to go to the Civil Court before you get any enhancement, and that means, of course, money.

42. Q. There is no power to go to the Revenue Authorities?—No, none. In fact, that Act has alienated the zamindar from the rayat. In the old days the zamindar and rayat were everywhere in a sort of partnership; now the zamindar says: "Why should I spend money on improvements; what is the good?" and I think he is quite right. There ought to be some incentive for him.

43. Q. Do you think that private works of irrigation might be more extended by more liberal advances of money (*takari*) by Government?—I don't quite follow you. What do you mean by private?

44. Q. I mean such things as wells, *ahars*, etc.?—In that case you will have to deal with the rayat.

45. Q. Do you think the rayat would undertake more of these works if he had more money placed at his disposal by Government?—I don't think so.

46. Q. Why not?—Well, you see, if a man borrows from Government, he has a very holy dread of what will happen to him if he does not pay up. He may get round his *mahajan* and put him off, but he cannot get round Government.

47. Q. You mean the system is too rigid?—Yes.

48. Q. (The President.)—Do you think you might have greater facilities given for lending money?—Well, that question was once thought of in the Shahabad Division, but the difficulty was to get the rayat to go to the Collector for money.

49. Q. If the Collector or a special officer went about with a bag of rupees in his pocket?—Well, if he paid the rayat, the rayat would have to pay somebody else sooner or later.

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50. Q. How do you mean?—I mean to say the Collector would give a rayat money, and the rayat would have to make payments by instalments and things like that, which is harassing. With Government you have many channels to go through before you get to the Collector.

51. Q. Supposing this is simplified?—There is always a disinclination for a rayat to go to the Government for money. I don't know why it is, but he has got an ungodly dread of doing so. If anything is done in regard to these irrigation schemes, where it is possible it ought to be done by Government.

52. Q. (Mr. Muir-Mackenzie).—That is for the big ones; but as regards the small ones, would you have Government undertake them too?—I think the only thing is for Government to take up the construction of small works.

53. Q. In other parts of India very large sums of money are taken by rayats?—They do so here with opium advances. They also take money to make wells, but that is not very generally resorted to.

54. Q. Why should there be more repugnance here than elsewhere?—I don't know, but it is so.

(Mr. Allen).—The Opium Department do advance money but it is very sparingly taken?

(Witness).—Of course you have to remember the holdings in Shahabad and Bihar are very small, comparatively speaking. You won't have a man having 50 acres of a holding.

55. Q. (Mr. Muir-Mackenzie).—In some parts there are a considerable number of wells?—Yes.

56. Q. Do you think these wells are made with borrowed money?—Possibly these wells are made with borrowed money, but it requires a very strong rayat to make a well.

57. Q. What is the district with which you are most familiar?—Shahabad.

58. Q. And how deep are wells there?—They run from 20 to 60 feet. The average depth may be taken at about 40 feet.

59. Q. And what sort of wells are they?—All sorts of wells.

60. Q. What is the method of construction generally?—Well, they have either to make it *pakka* with lime and mortar, or simply with two rows of bricks.

61. Q. What is the cost of construction of a *pakka* well?—Well, it should run from Rs. 100 to Rs. 150.

62. Q. You mean with lime and mortar?—No, that would cost more.

63. Q. Then what you mean; is that a *kacheha* well costs from Rs. 100 to Rs. 150?—Yes.

64. Q. A *pakka* well would cost much more?—Yes.

65. Q. How much more? Would it run to Rs. 1,000?—No. It would cost probably double the cost of a *kacheha* well.

66. Q. Would that be a double *mot* well?—Yes. There are one *mot* wells here, two *mot* and four *mot* ones. I am talking of a two *mot* well.

67. Q. How much would that well irrigate?—20 to 25 *bighas*.

68. Q. A *bigha* being how much?— $\frac{1}{4}$ th of an acre.

69. Q. With what sort of crop?—A mixed crop, i.e., *rabi*, sugarcane, rice.

70. Q. (Mr. Allen).—What do you say is the area irrigated by a well?—About 20 to 25 *bighas*.

71. Q. All the year round?—Yes.

72. Q. There is an extraordinary variation in the areas in different parts of India?—Yes. Even in Shahabad there is a great variation. In some places water is found very near the surface; in other places you get it very low down.

73. Q. You have been speaking of a two *mot* well?—Yes. It does not pay a man to make a one *mot* well.

74. Q. (Mr. Muir-Mackenzie).—Have you any experience of the total amount of unirrigated sugarcane?—This is not known in Shahabad. It is not heard of.

75. Q. You are not aware of it?—No.

76. Q. (Mr. Rajaratna Mudaliar).—What is the size of these two *mot* wells?—Well, I suppose about 6 or 7 feet in diameter.

77. Q. You said that in the case of the Sone Canals, south of Patna, the water-rate is paid by the tenants. Don't you

think where a zamindar gets an enhanced share of the produce, he should pay a proportion of the water-rate?—But where does he get an enhanced share of the produce?

78. Q. The tenant divides the produce with the zamindar?—That is under the *bhaoli* system. In Shahabad *bhaoli* is an exception.

79. Q. Where there is the *bhaoli* system, should not the zamindar pay a share of the water-rate?—As I have already said, there is no incentive to a zamindar to do that.

80. Q. Supposing Government constructs a canal in Bhabua, who will pay the water-rate?—The rayat who uses the water.

81. Q. And the zamindar will get an enhanced share of the produce?—He will take his chance of getting that share or not.

82. Q. Will not Government be justified in levying a portion of the water-rate from him also?—They will never agree to that. You see it would be a compulsory cess, and the zamindars will be up in arms at once, because it means another Government revenue. Many years ago, I think it was in 1870, there was a talk of a compulsory cess on the land-owner, but it was quickly dropped.

83. Q. You cannot call this a compulsory cess. Government gives you water and enables you to levy an enhanced share of the produce from the rayat?—Supposing the zamindar does not want the water, then it is compulsory.

84. Q. But tenants may want it?—Then the tenants should pay for it.

85. Q. Under the share system a zamindar gets half the produce of his tenant, which is much more with irrigation than without irrigation?—Yes, but as I said before, the enhancement of the crops lies entirely in the hands of the rayat. Supposing he will not cultivate, where is the remedy?

86. Q. So long as he pays the water-rate he will take care to reimburse himself?—That is a supposition, but I don't think the question of compulsory cess will come in at all. If the schemes you speak of could be possible, the rayats themselves would willingly take the water and pay the present cess now paid on the Sone Canal.

87. Q. The difficulty only arises under the sharing system?—That would right itself in time.

88. Q. (The President).—Has that system decreased since the Sone Canals have been in operation?—I mean the *bhaoli* system?—Yes, it will settle itself. The rayat himself now under the law can go to the Collector and commute his *bhaoli* into *nakdi*, so that if the water came, I am sure he would go to the Collector and say "I want my *bhaoli* made into *nakdi*."

89. Q. Is it within your knowledge that *bhaoli* has come to an end in the irrigated area?—Yes, *bhaoli* has ceased.

90. Q. Mr. Ram Narayan Singh suggested that the District Board might take over the management of the irrigation works. What is your opinion upon that point?—We could not do it better than it is done by the irrigation officers. Why saddle the District Board with this? They have enough to do with roads, dispensaries and schools; why saddle them with these minor schemes of irrigation?

91. Q. (Mr. Muir-Mackenzie).—You said that there was a very full demand for all the water that the Sone Canal could give?—Yes.

92. Q. At present rates?—Yes.

93. Q. Do you think that Government would be justified in taking any higher rates?—Well, Government have just done that. They have added on five annas a *bigha*.

94. Q. You think they have gone as high as they ought to go?—I would not like to say that. I believe a very much larger area can be irrigated than is being irrigated now.

95. Q. Do you think water is wasted?—Well, I would not say that. It is imprudently used by the rayat. It would go a very much longer distance if it were carefully used. They now damage their own crops by the abuse of water.

96. Q. Have you any idea as to how it could be regulated?—That brings in the question of irrigation channels, and that also brings in the question to whom should those channels belong—whether to the zamindar or to Government. If the subsidiary channels belong to Government, it would add very much more work to the irrigation officers but I believe a good deal more irrigation could be attained.

Of course, so far as we know, at least that is my personal opinion, that the duty of the water has not reached its maximum owing of course to the distribution which will be learnt in time.

97. Q. What facilities do you think a landlord ought to have to enable him to get an enhancement in respect of an improvement executed by him?—Well, I think there should be some inexpensive method through the Revenue Authorities or the Collector, whereby he should get a fair return of the capital sunk by him in improvements.

98. Q. Would you like the Revenue officer to estimate the value of the improvement and what increased rent it would be justifiable to charge in respect of it?—Yes, something to avoid useless litigation and costs.

99. Q. You mean a more summary remedy?—Yes, and a summary remedy which would give the zamindar an incentive to sink money, and they would do it if they could; but now you will not get any zamindar to spend a *cowrie* on improvements. Now, if he spends any money on improvements, he has to go to the Civil Court for enhancement of rent, and when he gets it, it is a very small return for the money he has spent.

100. Q. Do you think he would get a better return from the Revenue officer?—He would get more even justice. The Revenue officer could see what the land could give and estimate the value of the improvements and then fix the amount of enhancement. Now one has to go to the Civil Court, and then you are not sure of what you are going to get, or whether you will get any return on the money you lay out on improvement.

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WITNESS No. 4.—Mr. S. SHARAFUDDIN, Barrister-at-Law and Zamindar.

1. Q. (The President.)—You are, I understand, a barrister?—Yes.

2. Q. And you are also a land-owner?—Yes.

3. Q. Have you been resident here for a long time?—I was born here, or rather a few miles from here, so it is my home.

4. Q. You have seen all the changes that have been brought about by the introduction of the Sone Canals? You have lands here?—Mostly in Shahabad.

5. Q. Is your opinion in favour of the irrigation that has been done? Has it been a boon to the country?—Entirely so. I am entirely in favour of the irrigation done.

6. Q. Do you think, if water could be found, it would be desirable to extend it?—I should think so. In 1872 or 1873, before the introduction of the Sone Canal, the property that I now hold with some of the shareholders fetched about Rs. 8,000 a year. Now, after the introduction of the Sone Canal and after the improvements we have made on the property, the highest income that we have got has been Rs. 28,000.

7. Q. Do your tenants pay *bhaoli* or *nakdi*?—In the mauzaha I am interested in it is all *bhaoli*, except of course for sugarcane and poppy, for which we generally get *nakdi*. In Patna and Gaya the *bhaoli* system mostly prevails.

8. Q. Have you anything to suggest in the way of extending irrigation in Patna?—That requires a scientific knowledge.

9. Q. What would you say? There is, I understand, a great deal of irrigation done by the streams which come down from the Gaya hills?—Minor irrigation.

10. Q. Is that satisfactory?—Well, to some extent it is.

11. Q. I suppose it is very ancient and done for a long time?—A very long time.

12. Q. Does it work satisfactorily, or is there any improvement wanted there?—Improvements are wanted no doubt in the shape of repairing the old *pains*, throwing up earth-works and bringing water, and then owing to the change of the course of its streams it has become necessary to dig out new *pains*.

13. Q. That is, I suppose, because the subject has not been scientifically treated?—Quite so, Sir.

14. Q. These *pains* are the property of the zamindars who reap the benefit from them mostly?—No doubt, and of course in olden times they had not much knowledge.

15. Q. Do they now employ professional advice?—Very seldom.

16. Q. Are there any engineers making their livelihoods by assisting zamindars in such cases?—Since we have got a surveying school here we pass out a good many candidates as surveyors and overseers, who are doing some good to the country by giving advice to the zamindars, but these instances are not general.

17. Q. But there is not a livelihood to be made from it. If an engineer settled in Patna, who was known as a good professional man, would he be able to make a livelihood out of it?—I don't think so.

18. Q. We have heard complaints made of the disputes upon these *pains* and the inconvenience of having to take them before the Civil Courts. Do you think there is any

remedy to be found for it in legislation? Have you anything to suggest to make that easier?—I think legislation in this respect would certainly be a boon to the country.

19. Q. In what direction would you legislate?—In order that there should be facility in leading water to a place where at present they don't get any water.

20. Q. That is, passing the water through the lands of another man?—Yes, Sir. There should be a system of land acquisition for the purpose of small channels to be taken to private property.

21. Q. That does not exist in the *pains*?—I don't think there is any instance that may be quoted in this district.

22. Q. Would there be any advantage in strengthening the authority of the Collector of the District by giving him authority to settle disputes?—That would be an easier way than going to the Civil Court.

23. Q. Would that be a popular way?—It ought to be.

24. Q. Would it be?—I don't think it would be very popular, but it ought to be. You see the people are so very conservative. They want to fall back to their old system. If a new thing were to be introduced, they all fly from it. They don't like any innovation.

25. Q. Do you know the Bhabua Sub-division in Shahabad?—No. I have been there only once.

26. Q. (Mr. Muir-Mackenzie.)—Can you tell me why it is that the *bhaoli* rents on your estate have not been commuted, while there is such a tendency in the Shahabad District towards commutation?—I think by having the *bhaoli* system in this part of the country there is protection given both to the zamindars and to the rayats in seasons of scarcity of water.

27. Q. Yes, but then I suppose the same arguments would apply in the Shahabad District; would it not?—There is a difference there; they have got the Sone Canals.

28. Q. I thought you said you had the Sone Canals too?—No, only some few distributaries just at the extreme end of the Patna District.

29. Q. How is it you have succeeded in maintaining the *bhaoli* system on your estate?—In the first place, I have to pay about Rs. 2,000 a year for the water that I take to my village in the Shahabad District. I don't trouble the tenants; I pay it all myself and by easy instalments; I realise from my tenants half of it. That may be one of the reasons.

30. Q. (Mr. Rajaratna Mudaliar.)—You take also half the water-rate?—Yes, but I do that by very easy instalments.

31. Q. (The President.)—Are the water-rates high?—I don't think so—I mean to say, comparing the produce we get, they are not high at all.

32. Q. (Mr. Allen.)—Is it common for landlords to pay half the water-rates?—I think there are only one or two exceptions that do it. There are very few who do it. Although there is a rule of a certain commission being allowed to zamindars if they realise it from the tenants and pay it to Government, but very few do it. I, as a zamindar, pay my own rates, and also realise them from the tenants.

33. Q. (Mr. Muir-Mackenzie.)—Would you say this that, where the *bhaoli* system exists, a zamindar has considerable incentive to improve his lands?—No doubt.

Mr. S.
Sharafuddin,

24 Oct. 02.

WITNESS No. 5.—MR. F. AINSLIE, Sub-divisional Officer of Bihar.

- Mr. F. Ainslie.
21 Oct. 02.
1. Q. (The President).—Have you been long here?—About ten months.
 2. Q. And where were you before?—Monghyr was the last place.
 3. Q. Have you any irrigation in the Sub-division?—We have irrigation by *pains* throughout the Sub-division.
 4. Q. Your streams come down from the Chota Nagpur hills, I presume?—Our rivers all come from the Gya District.
 5. Q. Is there much trouble in the management of those *pains*?—On the whole it goes smoothly.
 6. Q. Do you think legislation is desirable?—I think it is necessary. I have seen several cases in which there are several co-sharers in a village where some of them will not do their duty in regard to repairing water channels, and in those villages the irrigation is not what it should be.
 7. Q. That is, the rayats?—No, among the zamindars.
 8. Q. What do you propose?—To place all *pains* under the Collector we have some Government estates in which we have only a share of the village, and we find some difficulty in getting our co-sharers to do their duty. Of course we are in a better position than other zamindars, and we can do their work and call upon them to pay their share, but even then we find a difficulty.
 9. Q. Would you give the Collector summary powers?—Certainly.
 10. Q. Among works required to be kept in order, do you include the clearance of *pains* and repairs of *ahars*?—Yes,

and *alangs* too; they are embankments for keeping in the water, as the *pains*, as a rule, are not very deep. If the *alang* were not there, the water would overflow.

11. Q. These *pains* are of very varying size, I suppose?—Yes, none of them are very big. I have crossed one in the rains several times, and I have never seen it more than neck-deep. And it would be about 50 feet wide. That is out of the common.

12. Q. Do not these *pains* occasionally get out of order and do mischief?—No, they do not do much mischief. If the people find too much water coming into the *pain*, they put up an embankment at the mouth of it; it is very easy to close it.

13. Q. What is your opinion as to giving advances for private irrigation works?—So far as the Bihar Sub-division is concerned, the rayats would not be willing. They look to the zamindar as the proper person to make and keep up irrigation works.

14. Q. Does the zamindar ever take it up?—Sometimes, but he is diffident.

15. Q. Do you think the District Boards could profitably control the irrigation works?—I think not; it is out of their province.

16. Q. (Mr. Muir-Mackenzie).—Have you the power to grant advances?—I had during the famine of 1897 in the Gobindpur Sub-division of the Manbhum District. I do not know whether I have the power now. I have given one or two loans for cattle, seed and agricultural implements, but not for irrigational purposes in my present sub-division.

WITNESS No. 6.—MR. A. OGILVY, Manager, Court of Wards, Gya.

- Mr. A. Ogilvy.
24 Oct. 02.
1. Q. (The President).—I managed the Tikari Raj in the Gya District for 16½ years.
 2. Q. Is Gya a district in which there is any urgent need of irrigation?—It is dependent entirely on irrigation. The works are protective and are necessary for the rice. I have known only one year in which irrigation works were absolutely disregarded. There are *ahars* for the protected portion, *pains* for the immune portion. . . . I remember only one year in which the *pains* failed. As a rule, there is always enough to save the rice. The *pains* depend on the rains from the Chota Nagpur slopes.
 3. Q. Are these counted on as infallible?—Yes, and there is always a large percolation going on, even if the river bed is dry.
 4. Q. You say the district depends altogether on irrigation. If the irrigation were to stop, would the people take to dry crops?—To a certain extent.
 5. Q. Does the *rabi* form any appreciable part of the cultivation of the district?—We used to calculate about six annas of *rabi* and ten of rice.
 6. Q. Is legislation desirable as regards the maintenance of these *pains*?—It is desirable for the construction of *pains*; the Collector ought to have power to acquire lands, where necessary, for the construction of a *pain* which he may think is for the common good.
 7. Q. Has he not that now?—I think not.
 8. Q. What is your feeling about the imposition of a water cess upon lands protected by works constructed by Government?—I don't think it necessary for Gya, because these irrigation works are not purely protective. They are re-productive; very much so. The zamindars would jump at any help or idea of co-operation from Government.
 9. Q. Do wells bear any part in it?—Very slight; they are only used for poppy and sugarcane.
 10. Q. Have you much experience of *takavi* advances?—Only in the Raj, and that was not for improvements, only for distress.
 11. Q. (Mr. Muir-Mackenzie).—What rate of interest did you charge?—Nothing.
 12. Q. (The President).—Now you are at Chupra. Is that as dependent on irrigation as Gya?—Not nearly. The works are not remunerative as they are in Gya; the conditions are different: Gya has a tremendous slope and Chupra next to none. In Gya the water can be laid on practically where you want it. In Chupra it is a matter of difficulty.
 13. Q. Are the seasons more favourable in Chupra than in Gya?—The rainfall does not differ very much,

but the district being flatter, the rainfall goes further. In Gya the slope is so great that without works the rainfall goes off at once. That is the distinctive feature of Gya.

14. Q. It makes it all the more remarkable to me that these *pains* can be administered and controlled without some technical knowledge?—When they are first constructed, I have no doubt the levels are faulty, but they very soon correct themselves.

15. Q. (Sir Thomas Higham).—Have you ever constructed any new *pains* in connection with the Wards estates?—Yes, about half a mile of a *pain* was washed away and we had to make practically a new work.

16. Q. And was that entirely for the benefit of the Wards estates?—Yes, but there were one or two other villages which got the benefit equally with us.

17. Q. Did they help at all?—We had to sue them for contribution.

18. Q. Have you found the expenditure on such works productive?—Tremendously.

19. Q. It gives you a good return?—Immediately. You may calculate on 30 per cent.

20. Q. That does not induce the private owner to extend them?—They cannot extend them, because they cannot get the necessary land.

21. Q. Some of these *pains* which irrigate the Wards estates also irrigate a great many other estates?—When they were originally made they were made by the Tikari Raj, and all the villages originally belonged to the Tikari Raj. Some have passed away out of the estate and others may have been given away as *jagirs*.

22. Q. Do you find any difficulty in getting what you want done on them owing to other partners?—In the Tikari Raj the management of these *pains* has all been recorded in an irrigation book which is now such ancient history that it is accepted by everybody, and within the limits of the recorded rights of each village there is no very great difficulty arising.

23. Q. You must have one controlling body, there is no doubt of it?—I sometimes have to take a strong hand.

24. Q. Personal influence, I suppose?—Yes.

25. Q. (Mr. Muir-Mackenzie).—What was the result to the crops in that year when the *pains* failed?—We lost very largely in the villages that were served by *pains*, but, curiously enough, the villages that were served by *ahars* only had a better crop that year.

26. Q. Can you account for it?—The villages served by *pains* did not keep enough *ahars*—enough storage.

27. Q. If they were kept up in connection with the *pains*, that might be an advantage?—It is difficult to get the room. As a rule, there is no space for it. It would practically mean taking land out of more profitable cultivation, and with the cost of the extra storage it would not be worth while.

28. Q. And what measures did you take when the *pains* failed?—We could do nothing.

29. Q. You did not dig into the rivers?—We worked them as long as we could get anything out of the river.

30. Q. Have you made many wells?—Yes, a great many in Tikari, but they are very expensive. I remember one cost Rs. 1,300. It was 70 feet dry. It was not for irrigation.

31. Q. But do you make many wells for irrigational purposes?—Not so many; a few.

32. Q. What did they cost you—say, a well with two *mots*?—Very few *mots* are used in Gya District; all

levers. It depends entirely on the situation. Close to the river bank it might be made very cheaply; a *kachcha* well could be done for Rs. 80 or Rs. 90, and a *pakka* well for Rs. 200, brick-lined.

33. Q. And on the higher land do you have to go through rock?—No, but very hard clay, generally about 40 feet. That would cost for a *pakka* well four or five hundred rupees. We should not make these for irrigation purposes.

34. Q. And what have you grown with them?—Chiefly sugarcane, specially valuable crops. We should not make them merely for *rabi*.

25. Q. (Mr. Rajaratna Mudaliar.)—Who keeps the *pains* in repair?—The Raj kept the *pains* in repair on its own estate.

36. Q. Did the villages contribute any labour?—The only labour the villages contributed, which is termed *goam*, was merely as much work as they could do with their hands or some rough instrument, not using *kodalis*.

Mr.
A. Ogilvy.
24 Oct. 02.

WITNESS NO. 7.—MR. S. M. NASIRUDDIN, Sub-divisional Officer, Jahanabad, Gya.

1. Q. (The President.)—I have been here over two years.

2. Q. You were on the Sone Canal?—Yes. My duty was to collect the water-rates in the districts of Shahabad, Patna and Gya. I was over six years occupied in that work; and during that time the revenue gradually increased. When there was scanty rainfall the canal revenue increased, and when there was plenty of rainfall less canal water had to be supplied.

3. Q. If the Sone Canals had double the water they have, would you have gone on increasing in the same way in revenue. Was there always a demand for water?—I think so; in the beginning we should have made it of more capacity.

4. Q. But if there is no more water in the river?—If Sone gave us more water, we could double the quantity.

5. Q. All the water was consumed?—Yes.

6. Q. Was there any complaint made of the water-rates being too high?—They were always complaining whether it was right for them to complain or not.

7. Q. The rates were raised?—Yes, more than once; but they paid every pice of it. The Sone revenue has been collected cent. per cent.

8. Q. But it has never paid interest on the capital expended on it. Would it be fair to lay a cess upon the whole district, because the people were saved from famine, whether they took water or not?—It would be fair, but the people would not willingly accept it.

9. Q. Was the navigation much appreciated on the Sone Canals?—No. Since the opening of the railway it has been entirely abandoned.

10. Q. Would it have otherwise increased?—We have been having fresh and better roads, and I think people would have employed bullock carts rather than boats.

11. Q. Do you know the Bhabua Sub-division of Shahabad?—I did not have charge of it; but as Deputy Collector, I had to deal with part of it.

12. Q. In your position as Deputy Collector of the Sone Canals had you anything to do with the measurement of the crop?—No, that was done by the Public Works Department.

13. Q. (Mr. Muir-Mackenzie.)—Had you anything to do with the granting of remissions?—Only in the case where items were "irrecoverable." When my procedure by certificate failed I had power to remit.

14. Q. (The President.)—Supposing you have a *katauni* to collect revenue, and the man says "I never had water; it is a mistake"? Where did he take his complaint?—To the Executive Engineer or Collector.

15. Q. Do you think the system worked well?—Very well.

16. Q. There were no complaints that the Executive Engineers were too harsh?—No. Where wastage rate was charged, it was discretionary to impose the maximum or the intermediate rate.

17. Q. Did they often appeal from the Executive Engineer to the Collector?—Not often.

18. Q. Can you suggest any improvement in the administration of the works of the Sone Canals to make them do their function better than they do now?—I think it works as well as it ought to do. There is a season when water is allowed to escape from the canals. It goes away for nothing. Why not let it go somewhere, say, in *ahars* or tanks, to be used for drinking or for irrigation instead of throwing it away; that is, if there were no engineering difficulties, and charge a small rate.

19. Q. Do they not fill village tanks when there is water to spare?—When application is made it is done.

20. Q. And charged?—I think not.

21. Q. Do you think that legislation is necessary for the proper control of *pains*?—I am strongly of opinion that legislation is necessary. I find difficulties in keeping proper control in keeping people from fights and riotings. This is exactly the season when fights do occur. I have to be always on the look-out. Say there is a *pain* which receives water from a certain stream. It goes on, say, a mile, and there are many other *pains* that take supplies from this parent *pain*. Then at one place it branches off to the right hand and at the same time to the left; suppose the land of the owner on the right side is on a high level, and that on the left at a low level: well, the land on the right belongs to one man and the land on the left to another, then the man whose land is on the low level is always on the look-out to dig and deepen the branch leading to his land. By doing that, every drop of water that comes to the mouth will necessarily go on to the left hand side. Can one stop him so digging on to his own land is a question? Case law is so very doubtful about it that we have to be almost silent. The people decide the case by force, and then we have to try a case of murder or riot. A record-of-rights should be made first of all.

22. Q. (Sir Thomas Higham.)—You think it is a pity the capacity of the Sone Canals was not increased?—Yes, provided Sone has the water.

23. Q. But has it?—It is for engineers to say that.

24. Q. Engineers say the capacity of the canal is limited by what it can give during the fifteen days in October, when every acre of rice requires water. Is their crop ruined if they don't have it?—Not exactly ruined, but the outturn would be less than it ought to be.

25. Q. If they can spread the irrigation over 25 days instead of 15, they could increase the area of irrigation in that way?—In quantity, not quality. I think more water should be given them. I do not agree with officers who charge the tenants with waste of water.

26. Q. Water should be given oftener and more in quantity?—Yes.

27. Q. (The President.)—But if you cannot get the water out of the river?—Well, it is a pity. Old and expert tenants think more frequent watering and keeping it a little longer will improve the crop.

28. Q. (Sir Thomas Higham.)—How often do they get water for an acre of rice—once a week?—I cannot say, but not so often, as the cultivators apply for it.

29. Q. What is the rule about remissions in case of failure of supplies?—That is settled by the engineers and their orders are appealable to Collectors.

Mr. S. M.
Nasiruddin.
24 Oct. 02.

Mr. S. M.
Nasiruddin.

24 Oct. 02.

30. Q. (Mr. Muir-Mackenzie.)—I understood your brother (Mr. Sharfuddin, Barrister-at-Law) to say that, as zamindar, he pays the whole of the rate?—Yes, he does.

31. Q. Did he undertake to do that?—He applied under a special provision in the rules for the water-rate to be paid by one contractor. He becomes the contractor and is entitled to recover a half share from the tenants. But that is only done where the zamindar is on very good terms with his tenants.

32. Q. He kept up the *bhaoli* system?—Yes. To commute the *bhaoli* into *nakdi* the zamindar will fight to have a fair cash rent, and that would be rather too much for them to pay in cash; it is easier for them to pay in kind.

33. Q. But how do you account for the very considerable commutations that have occurred in other parts of the canal?—The commutations have not occurred in the area irrigated by canals. In Shahabad, as a rule, the whole district has been always *nakdi*, except in a few cases. In the case of my brother's property it has been *bhaoli*.

34. Q. (Mr. Rajaratna Mudaliar.)—What is the total amount you collect in your division?—From eight to twelve lakhs according to the water supplied.

35. Q. What staff had you?—Two Deputy Collectors as my assistants, besides a very big office, and the division was divided into ten circles, each with a circle officer, and for each circle officer there was a certain number of tahsildars and peons to collect.

36. Q. What was the total cost?—It was very high, but now they have reduced it.

37. Q. Have there been many cases of charges for waste water in your time?—Not many.

38. Q. What is waste water?—A man who has never applied for water may take water from one who has been granted it.

39. Q. Surreptitious irrigation?—Yes.

WITNESS No. 8.—Mr. C. E. A. W. OLDHAM, Collector of Gya.

I

(Replies to printed questions.)

A.—GENERAL.

Mr. C. E. A.
W. Oldham.

24 Oct. 02.

1. The answers below refer to the district of Gya.

As the district officer of the district for about four years, I have toured through it in all parts and have devoted much time to making myself acquainted with the various methods of irrigation.

2. The statement marked "A" shows the average rainfall per month at the head-quarters station of the four sub-divisions in the district.

3. The following obstacles exist in this district.

(The answers here are independent of the arrangement of the question):—

(1) The sparsity of population in the jungly and hilly tracts in the southern part of the district.

(2) The thriftless character of the people.

(3) Want of education and enlightenment among the land-holding classes, who should initiate measures for the improvement of irrigation. Owing to the general prevalence of produce rents in this district and to the physical and climatic conditions that necessitate the up-keep of artificial works of irrigation, the duty of maintaining and inaugurating irrigation works lies to a peculiar extent upon the landlords, who are, however, unfortunately so backward and often so blind to their own real interests that they do not undertake such works.

(4) Lack of capital for the initial expenditure.

(5) Insufficiency of water-supply for any extensive projects due to physical conditions. The district is bounded all along the south by the high lands of the plateau of Chota Nagpur and the numerous spurs of hills that project from this plateau. The general slope of the district is from south to north towards the Ganges, and this slope is comparatively rapid. A large number of hill streams issue from these high lands and flow across the district from south to north. In the rains these are swollen torrents that carry with them quantities of gravel and fine sand that are deposited in the beds lower down. These streams are so rapid and the beds so sandy that within a few months, sometimes within a few weeks, of the cessation of the rains, the beds are almost dry. The rainfall is also small, and the surface drainage, except where blocked and stored up in artificial reservoirs, is rapidly carried off by these streams.

4. The prevailing tenure in the district is *bhaoli*, or a system of produce rents. Some 70 to 75 per cent. of the cultivation is held under this system. About 25 per cent. pays cash rents. The systems are not localized, or confined to particular tracts. Certain crops, however, are nearly always cultivated under the *bhaoli* system, such as rice; and certain crops, such as poppy and sugarcane, are invariably cultivated at cash rents. But the two systems exist side by side all over the district. In consequence of the *bhaoli* system and the general ignorance of the cultivating class, the tenants are markedly sub-servient to their landlords, and in many cases completely so. The result is that in most cases the rayats depend entirely for works of irrigation upon their landlords. Individually they have not the capital to undertake such works as the conditions of

the district require; nor have they acquired sufficient self-reliance to unite among themselves for the purpose of undertaking any works of general utility.

The permanent settlement is in force in this district.

5. (1) to (6). The statement marked "B" shows the number of loans under the Land Improvement Loans Act granted during each of the past five years and the nine months of the current year. Loans are taken by the people for improving or extending the means of irrigation with fair readiness. But I am of opinion that the system of making advances under the Land Improvement and Agriculturists' Loans Acts might be considerably improved in more ways than one, and further extended in the districts of Bihar. The chief drawbacks to the existing system, which, so far as I am aware, are felt by the land-owners and rayats, are—firstly, that the loans cannot generally be given at the very time they are wanted; and, secondly, that the procedure in force permits of persons applying for loans having to pay fees to clerks and others, in order to smooth the way as they think for sanction to, and actual payment of, the amount. A system should be introduced by which sanction to the grant of advances could be more promptly given and the cash paid personally by a gazetted officer at convenient centres.

6. I have not found this to be so.

(a) *Vide* above.

(b) Seeing the great improvement effected by the Soane Canal system in the comparatively small tract served by it in this district, the more enlightened classes are fully alive to the value of extended irrigation, and would welcome further extension.

B.—CANALS OF CONTINUOUS FLOW.

7. The only canal of continuous flow in this district is the Patna-Gya Canal (Barun to Khagaul), running almost parallel to the western boundary of the Gya District. The tract served by this canal grows the ordinary crops (*bhadoi*, winter rice and *rabzi*).

(1) To a small extent.

(2) To a great extent. Sugarcane, potatoe and poppy which could not otherwise have been grown are now grown in substitution of the ordinary food-grain crops.

(3)

(a) 15 per cent.
(b) 50 per cent.
(c) 75 per cent. } on area actually irrigated.

8. I would say Rs. 10 to Rs. 15 in case (1) and Rs. 20 to Rs. 25 in case (2).

9. (1) Rs. 3 per acre on the area actually irrigated.

(2) The custom differs in different zamindaris. In the case of *nakdi* lands an occupancy rayat pays the entire water-rate, but pays nothing extra to the *maliks*. In the case of non-occupancy rayats it depends on the zamindar how much he takes. It depends also on the land and crop. In the case of *bhaoli* lands the produce is divided half and half, or in such other proportion as may be customary. In *bhaoli* lands the duty of paying the water-rate falls pri-

marily upon the tenant. Usually he prevails on his *malik* to pay half, or such proportion as the *malik* receives of the produce, but sometimes the *malik* declines to pay any share.

(8) Nothing.

On the area actually irrigated in each case.

10. The expenditure on construction of village channels is generally incurred by land-owners, but occasionally by tenants when the land is held under occupancy rights. The tenants have no security for recoupment—at least none is known.

11. No deterioration to the soil, or damage to people has resulted so far. The canal serves but a comparatively small tract in this district. It has rendered fertile a most unfertile tract, a large part of which was sandy and unproductive.

C.—CANALS OF INTERMITTENT FLOW.

[N.B.—Small irrigation channels, supplied by temporary dams thrown across a river-bed, are included under this heading.]

Under this category the *pains* or artificial water channels customary in this district are considered, and the answers given below refer to those *pains*.

12. (1) and (2). *Pains* are artificial channels leading from a river, and dug out as far as the water is intended to be taken. Their width, depth and length depend, of course, on the supply of water available. The general condition of the rivers in this district has been described in paragraph 3 (5) above. These rivers are rapid torrents after heavy rain, becoming swollen in a few hours perhaps, and carrying with them quantities of hard white and yellow sand from the granitic hills of the Chota Nagpur plateau, and dwindling down usually by the month of October, to narrow little streamlets that wind a tortuous course through their broad sandy beds. The greater part of the sub-soil has been deposited by diluvion from these hills, and those of similar geological formation that feed the Sone river. This accounts for the large proportion of sand in the soil, and the large areas that are covered with pure sand. Owing to the slope of the country from south to north and the large number of streams that cross it from south to north, with their small tributaries from either side, the rain water is rapidly carried away across the district, or percolates into the beds of the streams, which are deeply filled with sand. To these conditions, coupled with the fact that at any time the rainfall is small, the district lying, like Shahabad, more or less between the area served by each of the monsoons, and receiving the full benefit of neither, must be attributed the relative unproductiveness of the soil, the large area uncultivated and the consequent thinner population in this district, as compared with others in the division. The systems of *pains* or water channels and *ahars*, or artificial reservoirs, have been devised to make the most of, and to supplement, this scanty water-supply. *Pains* have been cut from all the larger streams; some large, with many distributaries; some small, with few or no distributaries. The largest *pains* that feed a number of distributaries and irrigate many thousands of acres are known as *dasiain pains*, *dasiain* meaning literally a *pain* that has ten branches. The main channels are known as *pains*, and the smaller channels taking off from them are called *bhoklas*, while the smallest channels that lead immediately into the fields are known as *karhas*. The *pains* have been cut originally by the large land-owners, without any handwork to check the flow of water. In some cases in consequence the *pains* with a rapid fall have deepened and widened their own beds till the main river had adopted them and changed its general course, the old bed being gradually left on a higher level and becoming dry sooner, or even wholly forsaken except in the rains. This is a danger that should be provided against by legislation to enforce the provision of headworks. The entrance to a *pain* is always cut some way up-stream, above the lands it is required to irrigate, i.e., is taken off at a level higher than that of the lands to be served. During the rainy season, from July to September, say, the *pains* are full and flow well; but as the rains cease and the rivers dry up, the water from the bed has to be led into the *pain* by means of training works known as *derhiain* or *batuain*. In a year of scanty rainfall, or when the fall has been untimely, these *pains* are of great importance for the rice crop and the sowing of the *rabi*. Last year (1901) was such a year. There was hardly any rainfall after August, and the Hathhi Nakshatra, the most critical period for the paddy crop, when the ears are forming, passed by without a drop of rain. A sudden activity was immediately seen in all the rivers, training works were vigorously pushed on at the heads of

the *pains* to try and lead into them every drop of water that was still left in their beds. The more wealthy landlords caused *bunds* to be erected across the river-beds at customary places, to block up what water there was, and thus to give it a head into some *pain*. Mr. C. E. A.
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When the level of the country permits, the water is led into the field from the *pains* and *bhoklas* by means of the little channels called *karhas* already mentioned; where the level of the water in the *pain* or *bhokla* is below that of the fields on either side, the water is raised by some of the artificial means in use in this part of the country. The three commonest methods in this district are the *lathkunri* (lever and bucket), *chanr* or *sair* (water basket) and *karin* (wooden canoe-shaped lift). In the case of all the important *pains* that feed many villages, each village has its fixed turn of so many days or hours to use the water. This distribution of the right of irrigation from these channels by turns is known as *parabandi*. There is in this district a celebrated register of the distribution in the case of the principal *pains*, known as the Lal Bahl, prepared by the former owners of the Tikari Raj, the largest private estate in Gya. The entries in this book are still accepted as evidence of the rights of the villages specified therein. Frequently one village tries to take more water than it should; or else, when the rainfall is scarce, villages lower down the *pains* seek to get water before their turn, lest there be no water left when it comes to their turn; and the disputes often terminate in blows and occasionally in bloodshed. Quarrels are also common in regard to the erection of *bunds* or *garandis* across the *pains* or *bhoklas* to steal or divert the water. Considering the vast system of these channels in the district and the fact that they are all under the private control of the zamindars and villagers, and considering the vital importance of water in years of unfavourable rain, it is surprising how comparatively few cases end seriously.

All the large and important *pains* in this district were constructed long ago. I am not aware of any large *pain* having been newly constructed in recent times. The inception of such a work must come from a single capitalist landholder, who has the means to carry it out, and the incentive to do so, that is to say, whose personal interest it is; or else from two or more combined in interest, who are similarly circumstanced. And here we come to the difficulty that stands in the way of any such private enterprise on a large scale at the present day. The gradual disintegration of property, the *parcelllement* of rights which is encouraged by our own legislation, is the cause of this difficulty. Where formerly there was one land-holder supreme in authority over a certain large area, there are now perhaps fifty petty land owners, whose interests conflict, or whose relations are so strained *inter se* as to render combined action impossible.

The consequence of this change of things is manifest in places from the neglect of existing *pains*. Only recently in a tract in which scarcity was apprehended the complete disrepair of an important *pain*, that formerly served, it is said, some hundred mauzas, was brought to my notice. It is a *pain* which, if properly repaired, would save a large part of the tract in question from the possibility of famine; but when I endeavoured to persuade the local zamindars to take the work in hand, I found that the proprietary rights in the land had been divided up to a remarkable extent since the *pain* was constructed originally, and that the antagonistic attitude of certain proprietors made it impossible for me to take any steps in the matter. The rapid sub-division of proprietary rights is patent to officers that have to administer the partition law. As this proceeds there is a tendency for these important works of irrigation to fall into disrepair—works that are essential for the growth of the chief crops in this district, and without which a considerable portion of the cultivated area would remain untilled. As it is, the greater part of the cultivating class, a large proportion of the total population, have little to spare after meeting the necessities of life; and if these irrigation channels are not maintained, the present density of population cannot be kept up. It is probable, in my opinion, that this question will at some future date press upon the notice of Government and call for remedial measures. It will be well to consider it before such time. Unfortunately it is a matter that would call for legislation. Government could not undertake the control and up-keep of the *pains*, or substitute a canal system without reappropriating itself by levying a rate or cess; and a difficulty would lie in determining what proportion of such cess or rate should be levied from the proprietors and what from the cultivators. If a system of canalisation from the smaller rivers is professionally declared to be impracticable, the *pains* will have to be maintained; and Government should, at all

Mr. C. E. A. events, so far exercise control that no *pain* should be with-
W. Oldham. out a masonry head-work to regulate the inflow, and prevent
scouring out and rivers changing their courses and damag-
ing fertile fields.

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(3) The period for which the supply is ordinarily main-
tained in sufficient quantity is—

(a) Four months, *i.e.*, from July to October.

(b) Three months, *i.e.*, from July to September.

(c) The period varies according to that during which
the rivers are supplied. I have already referred
to the fitful flow of the rivers in this district.
They may fill for a few days and be almost
empty for the next fortnight, and then fill again
with a day or two's rainfall, and so on. This is
the reason why a system of canals of continuous
flow is impracticable in this district; but it is no
reason why some measures should not be taken
by Government to make the most of the facilities
that do exist, and at least control and regulate
the construction and working of the *pains*, with-
out unnecessarily interfering in the private
rights involved.

13. (1) To a great extent. *Bhadai* is the only crop in
his district that can be depended on without some means
for artificial irrigation.

(2) To a very large extent, chiefly in rendering the
cultivation of paddy and sugarcane possible, where it would
otherwise not be.

(3) About—

(a) 10 per cent.

(b) 45 per cent.

(c) 70 per cent.

14. About—

(1) 10 per cent.

(2) 30 per cent.

15. No; not ordinarily, but frequently in the case of
crops accustomed to well-irrigation. 12 or 13 per cent.
of the total irrigation in this district is effected from
wells. It has already been explained how water does not
remain in the rivers for more than a few months, and the
pains usually dry up before the end of the year. Irrigation
thereafter must be carried on from *ahars* or wells. In a
dry year the *ahars* also dry up by the end of the year, and
from January to June recourse must be had to wells, except
when rain falls. The extent to which irrigation from
pains is supplemented by irrigation from wells depends
then chiefly upon the character of the season. It may be
stated as the general rule in an average year that in case of
the crops requiring irrigation between January and June,
wells must be resorted to. For instance, poppy and sugarcane
cultivation and various kinds of market produce in-
variably require to be irrigated from wells in this district.

16. (1) and (2) *Fide* answers to question 8 above, *i.e.*, in
case of continuous canals.

It is difficult to form such an estimate: but the increase
would, of course, be less than in the case of canals of con-
tinuous flow.

17. (1) No rate per acre is levied in the case of *pain*
irrigation.

(2) These *pains* are part and parcel originally of the
bhaoli system of tenure. Under this system the produce is
divided between landlord and tenant. The landlord is sup-
posed to maintain such works of irrigation and to reap his
recompense in the form of a larger amount of produce as
his share. I say the landlord is supposed to maintain such
works, because they do not always do so, or where they do,
they do not always do it wholly at their own cost. They
often make their tenants labour without charge, or else
appropriate a larger share of the produce than they should
according to the strict principles of the system. The ideal
rule of the *bhaoli* system is that the produce should be
divided half-and-half between landlord and tenants, and
there are many officers who suppose that this is the general
practice. As a matter of fact, however, division by half
is very rare. The landlord generally takes nine-sixteenths
of the produce and often ten-sixteenths. In explanation of
this apparently unfair distribution, they plead that they
maintain the irrigation works in good order and better
than other landlords who take a smaller share of the
produce. In exceptional cases a landlord may also take less
than a half share of the produce, *e.g.*, when jungle or
waste land has to be brought under cultivation, or in special
cases when the cultivation requires unusual labour on the

part of the tenant; but these cases are infrequent, and the
ordinary practice, excepting only cultivation under special
circumstances, undoubtedly is to take considerably more
than half. It will readily be observed that this is nothing
less than the exaction of an increased rate of rent on account
of maintaining the works of irrigation, which the advocates
of this antiquated system of tenure would assert to be the
inherent duty of the landlord, and the ready performance
of which duty by the landlord is regarded by superficial
observers and by admirers of the *bhaoli* system as its greatest
charm and as conclusive evidence of the excellence of the
system.

As the amount of extra demand levied in this way de-
pends, firstly, upon the character of the zamindar, and,
secondly, upon the price-current of the particular kind of
produce at the time, it is not possible to state an approxi-
mate rate that would be generally applicable.

(3) and (4) Nothing is paid in such forms to Govern-
ment by the owners.

18. Excluding the initial cost of digging the *pains* which,
I take it, is not referred to here, there is the cost of up-keep
and the cost of labour employed in leading the water into
the fields from the channels. Owing to the generally sandy
nature of the river-beds, the *pains* become silted up quickly
and have to be cleared out every year or two. Considerable
expense is incurred in this process—expense which primarily
falls upon the landlords, but all ordinary clearance of chan-
nels is done by the cultivators themselves by what is known
as *goam*.

The cost incurred by the tenants in leading the water to
the fields is small, this work being usually done by the
cultivators themselves.

19. I have observed no damage caused by irrigation it-
self in this district. But damage has been indirectly caused
in some places by rivers changing their courses owing to
the excavation of *pains*. In this way I have seen the lands
of several villages covered with sand and rendered un-
cultivable. There can be no doubt, too, that the net-work
of *pains* in the district must carry quantities of sand about,
and eventually increase the proportion of sand in the soil.

There is no water-logging in this district, as the slope
from south to north is rapid. A consequence of this slope
is that there is no need of raising high banks to the *pains*,
the level of the water being generally below the ground level
on each bank. The *pains*, too, are nearly always cut along
the natural lines of drainage.

20. These *pains* are constructed and maintained by the
landlords with the reservation I have already noted in
paragraph 18 above. Ordinary petty maintenance, such as
clearance of silt, repairs of small breaches, etc., is done under
the *goam* system. At the order of the landlord or his
local agent or servant, the cultivators have to supply one
man per plough to turn out on these occasions to carry out
such work. They generally turn out in a body at such
times, and this is known as *goam*.

The approximate annual cost per acre cannot be ascertain-
ed with any approach to accuracy.

The system of *pains*, as it exists in this district, is
indispensable for great part of the cultivation, and it works
fairly well. As I have already stated, the *bhaoli* system of
tenure is intimately connected with this system of irri-
gation. Both are the result of the physical conditions of the
district, and they are largely inter-dependent. If the *bhaoli*
system were abolished, these *pains* would fall into disrepair.
The cultivators could not, or would not, combine of their
own accord to keep them up. The greatest drawback to these
systems is that the control of the irrigation works gives
tremendous power to the landlords over their tenants. They
place the tenantry in more or less complete subjection to the
landlord, who can, and very often does, extort most unfair
terms from his tenants. This system of irrigation fosters,
as it were, the *bhaoli* system of tenure, which is an
anachronism, and is the cause in great measure of the serf-
like status of so many of the tenantry in this district. In
my opinion legislation is required and will eventually
have to be faced. The following are the two most import-
ant directions in which action is at present required:—

(1) The provision of a masonry head-work in every
pain to control the level at the entrance and
regulate the inflow. I have already referred to
the damage that has been caused by *pains*
scouring out at the head, deepening and widen-
ing its channel, and thus leading ultimately to a
change in the course of a river. Besides this
danger, there is the injustice often caused by

one *pain* taking off higher up a river, appropriating all the water in the river. It has been a long existing practice, too, in places to construct *bunds* right across the river, to drive the water into a *pain*, and thus deprive lands further down stream of all supply.

- (2) The enforcement of the up-keep of existing *pains* in *bhaoli* tracts. The liability of *pains* to become neglected owing to the sub-division of proprietary rights has already been noticed. In this way a very heavy and unjust loss is caused to the cultivators by the neglect of quarrelling shareholders; and measures are necessary to protect the cultivators in such cases. Power should be given to the local officer to intervene in case of neglect and levy the cost from the proprietors.

It will be a question, in my opinion, at some future time, whether Government should not assume the entire management of the *pains* or undertake a system of canalisation on their lines, in which case division of produce by half and half exactly between landlord and tenant would have to be enforced, or else cash rents introduced, and the water-rate would be levied equally from landlord and tenant. This, however, is not urgently required; but the two measures stated above are very necessary.

21. (a) *Pains* are essentially private canals. The persons entitled to use the water of *pains* have *paras*, or turns, assigned by mutual agreement or ancient custom, and disputes both in the Criminal and Civil Courts constantly occur in this connection.

(b) Government has not done so hitherto.

22. Yes, if legislation were effected on the lines indicated in my answers to question 20 above, I think it would be most desirable to encourage and assist in the construction of *pains* by private persons. This might be done by granting liberal advances for specific and professionally approved works of this nature.

D.—TANKS.

23 (1) and (2). Tanks are seldom used for irrigation in this district, but *ahars* will come under this category. An *ahar* is an artificial catchment basin formed by blocking the drainage of the surface water, or even by blocking a small drainage rivulet, and thus backing up the water. These catchment basins are nearly always of a more or less rectangular shape, embankments being raised on three sides of the rectangle, the fourth side being left open for the drainage water to enter. Owing to the slope of the land, the highest embankment is usually on the north, and this embankment generally runs east and west. From each end of this embankment, other embankments project southwards, diminishing in height as they proceed according as the level of the ground rises. In this way a three-sided catchment basin is formed, deepest at the northern side where there is always some arrangement, at the spot where the drainage of the catchment area would naturally issue if there were no embankment, to let out the water from the *ahar* for purposes of irrigation; and if the *ahar* is built on a drainage rivulet, and thus receives the drainage of a larger area than its own, there is a spill or weir to pass off surplus water, which may perhaps flow on to another *ahar* farther north. These outlets and spills, or weirs, are formed in various shapes and known by various names. In small *ahars*, where the quantity of water banked up is not great, it is generally sufficient to cut a narrow passage through the earthen bank at the deepest spot to draw off the water as required. If the mass of water be greater, a half pipe formed out of the trunk of a palm tree and known as a *dhonga* is let into the bank to protect it from excessive erosion. If the *ahar* is a very big one, a masonry outlet is often built into the bottom of the bank, known as a *bhan* or *bhauari*. The weirs or spills to pass off surplus water are made of brick or stone masonry and are known as *chilka* or *chahka*. The different banks and portions of an *ahar* all have distinctive names. When the water of an *ahar* is wanted to irrigate, not the lands to the north, which are on a lower level, but lands to the east or west on the same or a higher level, the water is lifted by some one of the numerous methods adopted in Bihar for lifting water. The commonest methods in this district are *chanr* or *sair* (swing basket, or tin case), *lath-kunri* (lever and bucket), and the *kuria* or canoe-shaped lever, that is dipped into the water by the foot, and then lifted up by means of a lever overhead with a weight at the end of it. One or other of these lifts is erected on the edge of the *ahar*, and the water is lifted into a channel on a higher

Ben.

level through which it flows to the field where it is required. Mr. C. E. A. If the water in the *ahar* be low and does not reach the bank, a depression (*kandari*) is dug by the side of the bank, and a small channel out from the deep part of the *ahar*, leading into this depression. Sometimes when the level of the water is very low, it is necessary to employ a series of two or even three lifts to raise the water to the level required. The prime value of these catchment reservoirs is that they store up water that would otherwise be carried away by the naturally rapid drainage of the country. The rainfall in this district is so small, and so uncertain as well, that the cultivators cannot depend upon it. It is quite insufficient, in fact, to maintain cultivation all the year round. If it were not for these *ahars*, there would be no water on the higher lands (where *pains* are not practicable) available for purposes of irrigation after the month of September. They are indispensable on the higher tracts that lie between the river-basins, firstly, for irrigating the paddy as it grows up, and, secondly, for the sowing and germination of all the *rabi* crops. I give this description of *ahar* irrigation at some length, as it is specially prevalent in this district; at the present time almost half the irrigation carried on in this district is effected by the *ahar* system; and as I find it has previously been inaccurately described, or confounded with the system of *genrabandi*, which is a different thing, or else connected with *pain* irrigation from which it is quite distinct. A *pain* may eventually, after it has almost spent itself, lead into an *ahar*, but such cases are rare, and *pain* irrigation is not possible on the highest lands for which the *ahar* system has specially been devised.

Irrigation from tanks, which are comparatively few, is carried out in much the same manner.

(3) (a) Four to six months, July to December.

(b) Four months, July to October.

(c) Dependent on rainfall.

(4) Depends on the size of the *ahar* or tank. The largest in this district must irrigate about 1,000 acres.

24. (1) to (3) To a much less degree than in the case of canals of continuous or intermittent flow.

25. About—

(1) 10 per cent.

(2) 30 per cent.

26. Vide answer to question 15 above.

27. See answer to questions 8 and 16 above. The increase is less in the case of *ahars* and tanks, and specially in the case of tanks, where the difficulty of lifting out the water is considerable.

28. (1) to (3) N7.

29. This is done by the tenant himself. The actual cost cannot be stated. He has no security for recoupment.

30. Vide answers to question 20 above. In the case of *ahars* small repairs are done by the tenants, large repairs by the landlord. I would say 4 annas to 8 annas per acre irrigated should be spent annually to keep an *ahar* in good repair. The amount, however, depends largely on local conditions, nature of soil, etc.

Tanks are falling into disuse in this district and are not maintained in repair.

31. I know of no such case.

32. Yes, by advances to landlords for specific approved works.

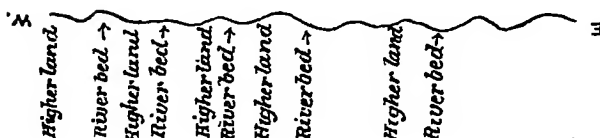
33. Inconvenience is felt. See answer 30 above. Tanks are not kept in repair at all, I regret to say, in this district. They have been largely superseded, however, by the *ahars* which are found to be much more convenient for purposes of irrigation. *Ahars* are usually constructed on high lands where the clay is comparatively hard and little silt accumulates. *Ahars* are generally kept in good repair. This is done by digging a layer of soil from the interior of the *ahar*, and heaping the soil on the banks where required.

E.—WELLS.

34. As far as wells are concerned, the surface configuration of the district need only be considered. There is the hilly country all along the southern side of the district, and

Mr. C. E. A. the easy slopes and plains of the rest. A section from W. Oldham. north to south would be something like this:—

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Again, the district is crossed from south to north by numerous rivers, the beds of which and adjacent lands are low, the land between each river basin is raised. Thus a section from east to west would be something like this:—

(1) The average depth of a permanent well in the lower tracts or near the rivers is from 15 to 25 feet, but on the higher tracts it varies from 35 to 40 feet.

(2) (a) and (b) The supply is chiefly from percolation, but occasionally from springs. A well with a good spring will never fail, but a well served by percolation only is liable to fail in dry years and in ordinary years in the hottest months, if not cleared out.

(3) The cost varies with the depth and diameter of a well. The average cost of a good masonry well of, say, 4½ feet diameter will be perhaps Rs. 300.

(4) A good masonry well would last 200 years, but if built of bricks set in mud, it will not last more than 25 years.

(5) With the *lath-kunri* (lever and bucket). The *mot* is rarely used here.

(6) About 5 acres.

(7) About 5 acres.

35. (1) *Vide* answers to questions 7 (1) to 7 (3) (c), 13 and 24.

(2) Land irrigated by wells is usually *defusila* in this district. Well-irrigation is almost wholly confined to the immediate vicinity of the villages, where poppy, market, garden produce, *marua*, barley and such like crops are grown, and where the produce is much better and more valuable than in the lands further from the village irrigated by *pains* and *ahars*. Well-irrigation is hardly ever resorted to in the case of the *kharrif*, or the larger portion of the *rabi* crop. Perhaps 9 per cent. of the wells in the district are on the *dihans* lands, or lands immediately adjoining the village.

36. The lands commanded by wells in this district are the higher lands around the village. This method of irrigation has always been adopted on such lands, and no comparison with other conditions is practicable.

(1) 50 per cent.

(2) 500 per cent.

37. (1) and (2) No such rate is paid.

37. (II) *Vide supra*.

38. (1) Frequently in this district rock is met when excavating a well. The custom is to dig tentatively before embarking on a masonry project.

(2) Not very often, but in several parts of the district in small areas the clay is unsuitable for well-digging, as it falls in at once. Such clay is locally known as *kachua mitti*, from *kachua*, a turtle, either because these animals are supposed to burrow in the earth, and thus cause the sides of the well to fall in, or because the clay resembles the puddle-like clay ejected by the turtles when they burrow.

38. (II) The result of an experiment once made in boring is given in Appendix C attached. No assistance has been offered to, or sought for, by any private individual to my knowledge. I think the people know best what suits them.

39. No, not in this district, where irrigation by wells on any extensive scale is not practicable. The efforts of Government would be better devoted otherwise.

40. Temporary wells are commonly used in this district in tracts where the soil is sandy, or a long water-course. They afford considerable protection to the poppy which is largely grown in this district, and in a less degree to other dry crops.

40. (II) I would only take measures in this direction in a year of drought, and would give advances widely for their construction. Their cost is but Rs. 4 or Rs. 5 on the average.

APPENDICES.

A.

Table showing the monthly average rainfall recorded at the undermentioned stations.

Name of month.	Sadar Sub-division.	Nawada Sub-division.	Aurangabad Sub-division.	Jehanabad Sub-division.
1	2	3	4	5
January . . .	0.58	0.66	0.60	0.70
February . . .	0.67	0.61	0.47	0.56
March . . .	0.43	0.50	0.43	0.37
April . . .	0.26	0.23	0.19	0.16
May . . .	1.33	1.76	1.33	1.46
June . . .	6.66	6.28	5.49	5.64
July . . .	13.10	11.71	12.76	12.60
August . . .	12.50	11.50	13.43	12.00
September . . .	6.89	6.43	6.80	5.87
October . . .	2.21	2.87	2.27	2.54
November . . .	0.38	0.16	0.25	0.27
December . . .	0.18	0.17	0.25	0.13
Total . . .	45.09	42.88	44.31	42.89

B.

Statement showing the number of land improvement loans granted during the past five years and the nine months of the current year (1901-1902).

Sub-division.	1896-97.	1897-98.	1898-99.	1899-1900.	1900-1901.	1901-1902 to date.
Sadar . . .	81	Nil	18	48	41	11
Aurangabad . . .	24	Nil	Nil	1	4	23
Nawada . . .	2	1	Nil	Nil	Nil	1
Total . . .	107	1	18	49	45	35

C.

Extract, paragraph 92, of the Land Revenue Administration Report, Bengal, for the year 1892-1893.

92. *Tube-wells*.—The Collector of Gya reports that a tube-well was sunk in the Government Estate of Karanpara to a depth of 4½ feet in a sub-soil of stiff yellow clay. The experiment seemed to show that in a stiff clay soil a tube-well is useless, and that a 25 feet

limit under a simple draw-pump is also useless for the Gya District, since in the hot weather numbers of these wells are dry to a depth of 40 feet. The experiment was made in March in a locality where the water was at the time about 15 feet below the surface. In the hot season the water here falls to 30 feet. The Collector proposes to bore through a further depth of 30 feet (apparently to a depth of 60 feet altogether) in the hope of tapping a spring. He reports two noteworthy successes in the use of tube-wells in the Gya District. One of them relates to the well supplying the locomotives in the railway station. The depth of that well is considerable, but the Collector does not know the exact dimensions. The well ran dry in

the hot weather. A 6-inch pipe was driven through the bottom to a depth of 20 feet below. Water was obtained and has never failed since. The cost was trifling. The other relates to the Jubilee well in Tikari; it was sunk to a depth of 40 feet, when all hope of success seemed to be at an end, and the masonry well showed signs of giving way. A smaller well was then driven down in the centre to a further depth of 20 feet. The water rose 40 feet in a night, and has stood at that height (roughly 20 feet from the surface) ever since. The results are important as showing the possibility of obtaining water for irrigating sugarcane in the Gya District in May in the hottest season when the ordinary wells run dry.

Mr. C. E. A.
W. Oldham.
24 Oct. 02.

II.

Memorandum.

No. 1538-G., dated Gya, the 23rd October 1902.

From—C. E. A. W. OLDHAM, Esq., C. S., Collector of Gya,

To—The Commissioner, Patna Division, Bankipur.

In reply to your letter No. 5174-G., dated 26th ultimo, in regard to the question of the expediency of legislating with a view to give Government control over the fighting for water which now takes place and whether any of the major private irrigation works should now be taken over by Government, I have the honour to submit the annexed copy of the opinion given by the Executive Engineer, Eastern Sone Division. It will be seen that Mr. Bremner does not consider that Government should actually control the distribution of water from *ahars* and *pains*, but he is of opinion that it might be possible to establish a record-of-rights for each river, *pain* and *ahar*; and landlords should be compelled by law to keep all their weirs, *pains* and *ahars* in good order, to provide head sluices to *pains*, and masonry escapes and outlets to all large *ahars*.

2. I am strongly of opinion that some legislation will have to be taken, as I have already stated in my answers to the first series of questions issued by the Irrigation Commission (*vide* answer to question 20). I have further considered the subject since and have consulted many landlords and others and consider that the District Officer should be empowered by law to enforce the maintenance in good repair of all *pains* and *ahars* used for irrigation, and in case of default to be empowered to have the necessary repair carried out under his own orders, and to levy the cost thereof from the landlord or landlords concerned in proportion to the extent of their interests. I am not of opinion that such control as I would propose would prevent fighting over water. Such disputes take place even in canal irrigated areas, though to a small extent no doubt.

3. In order to keep up the irrigation works and with a view to the distribution of water according to the recognized turns or rights, a man might be retained in each village, to be paid by a cess from the villagers themselves, whose special duty it would be to look after these works and give each cultivator his water in due turn. The District Officer should be empowered to appoint such a village servant in any case in which he found sufficient reason, in consequence either of the occurrence of frequent disputes, or the large extent of irrigation, or for other reason. In case this man's remuneration whether in cash or kind were not paid by the village, the District Officer should have power to enforce its payment. At first such appointments might be made only in the case of the more important *pains* and *ahars* in which many proprietors have separate interests, and the result of the experiment awaited. It is no use, however, hoping that

by the assumption of Government control, fighting about water will be prevented. Such disputes will always occur in years of drought.

4. I have suggested above that servants of the villages should be appointed, as this system is calculated to work much more smoothly than the appointment of direct servants of Government, who would be a source of much greater harassment and expense to the people.

5. I have already stated in my answers to the questions put by the Irrigation Commission that proprietors should be compelled by law to make masonry head works for every *pain*. I am also of opinion that they should be compelled to make masonry outlets in all *ahars* where the District Officer may consider it necessary.

Dated Baroon, the 19th October 1902.

From—The Executive Engineer, Eastern Sone Division,

To—The Magistrate and Collector, Gya.

With reference to your endorsement No. 1424-G. of 27th ultimo on letter No. 5174-G., dated 26th idem, from the Officiating Commissioner, Patna Division, I have the honour to report that I do not consider that it would be advisable for Government to interfere with the actual distribution of water from *ahars* and *pains*. The supply of water is not sufficient for all in years of scanty rainfall and if the distribution were taken over by Government, cultivators would quickly forget their previous troubles and attribute all the damage done by want of water to mismanagement. A large establishment of subordinates with attendant evils would be wanted to supervise the distribution, and I am certain that the cultivator would not really be much better off than at present as the cost would be heavy.

It might be possible to establish a record-of-rights for each Nuddi, *pain* or *ahar*. If this could be done, I think there would be less fighting over water, as the parties would at least know for certain which side was in the right.

2. With regard to the proposal that some of the major works should be taken over by Government, I am also of opinion that this would not be advisable. I think that the landlords should be compelled by law to keep all their weirs, *pains* and *ahars* in good order, to provide head sluices to *pains*, and masonry escapes and outlets to all large *ahars*.

Beyond this I would not recommend Government interference in the management. The cost to the cultivator would, in my opinion, more than counterbalance the advantage he would derive.

1. Q. (The President).—How long have you been Collector of Gya?—For nearly five years.

2. Q. Before that were you in this part of the world?—Yes, I have served in Shahabad, in Durbhanga and in Monghyr also.

3. Q. And you have probably had some experience of famine?—Very slight. In 1892 in the Monghyr District I was in charge of a small famine relief circle. The distress was not severe.

4. Q. Would you say that there was any place in your district where there is a reasonable fear of famine, or are you practically immune?—I don't think we are immune, but we are almost immune at present. There are one or two tracts in the district in which I think famine might occur.

5. Q. And what is the characteristic of these districts? Is it an absence of *pains* or *ahars*, or is there any deficiency of rainfall?—The normal rainfall is low in our district as it is in the Shahabad District. Secondly, the means of irrigation in these tracts are few and unreliable; the lands are high; the soil is not very productive; and if a good rainfall does not occur, the reservoirs and artificial channels for irrigation are not filled, and consequently the crops suffer.

6. Q. What would be the remedy for this?—The only remedy is the extension of the system of artificial irrigation by channels, reservoirs and wells.

7. Q. The extension of channels and reservoirs has probably its limits; has it not? Has all been done that can be done?—I think not in the case of channels, and in the case

Mr. C. E. A. of reservoirs also, I think, there is room for extension and improvement.

21 Oct. 02. 8. Q. These channels; are they derived from the stream^s coming from the Gya hills?—From the hills of Chota-Nagpur which fringe the Gya District.

9. Q. And which are torrential?—Quite so, with the exception of two or three streams which are more or less perennial. The Punpun generally has water all the year round, though it has very little in the hot weather; and there are two other small streams which retain their water.

10. Q. The Poon Poon passes through Patna also?—It does. It is a small river, but still it retains water, owing to the soil through which it flows.

11. Q. These *ahars* and channels are very ancient, I suppose?—They are, no doubt.

12. Q. They are entirely of native making. They have not been suggested by us?—Not at all. By far the greater part of them date from before the British rule. The tendency now is for these channels to fall into disrepair owing to the disintegration of proprietary rights. Formerly when these channels were made they were made by the order of large zamindars who owned large estates and had large powers—powers which no zamindar at the present day wields or can possibly wield under our laws. For instance, the Maharaja of Tikari was all powerful in the district one hundred and fifty years ago, and in the time of previous Maharajas, who had similar authority, the greater portion of these channels were made, though we have no historical records of this. Now it is impossible for such new channels of this description to be made by any zamindar, because he will have to carry them through the lands of other zamindars who will not agree, or who will obstruct in some way or another.

13. Q. Then that state of things is at least partly due to this unfortunate want of cohesion among them in recognising common objects?—It is the state of society at present. It is a lamentable condition of things no doubt, but it is a fact that no two neighbouring zamindars will combine together to help in a work of common benefit.

14. Q. And that the zamindars in this great sub-division of land are not as large zamindars as there were formerly?—Not nearly. This disintegration is going on daily. It is admitted by all.

15. Q. What is the remedy?—Disintegration we cannot prevent. The only device for getting round the difficulty is legislation.

16. Q. Legislation in the direction of making the authority of the Collector more supreme?—Of enforcing the up-keep of these channels on which the cultivation of the soil or of parts of the soil of the district depends, maintaining them, repairing them and extending them where necessary. Without legislation this cannot be done. It is impracticable at present. I know many cases of *pains* which have fallen into disrepair owing to these causes and which have either become unused or partly unused, or so largely silted up that they are rendered less serviceable than they used to be.

17. Q. And would you give the Collector summary powers to levy a fine in order to get the work done or force the men to carry it out?—I would give the Collector such power as this that he should be in a position to say to certain zamindars who own the lands through which these channels pass, "repair them," and if they did not carry out his instructions, he should be empowered by law to have the work carried out himself and to realise the cost from these zamindars in proportion to their interests.

18. Q. Do you think the effect of such a law being passed would be to put them on their mettle. If not, it would give the Collector a great deal to do?—I think it would have that effect also.

19. Q. Do these works really require some professional advice to manage them?—They do in their inception. That is another point on which legislation is required. No new *pain* should be constructed unless it be approved by some professional man.

20. Q. I gather it would not be very easy to construct a new *pain* without interfering with the rights of some other zamindars?—It would be difficult. Objection would no doubt be raised by the zamindars having riparian interests further down. They would perhaps go into the Civil Court for an injunction or for damages.

21. Q. (Sir Thomas Higham)—Can they get an injunction to prevent them?—I think so. Certainly. The Civil Court has full powers to interfere in such matters.

22. Q. They can prevent a *pain* being constructed?—They can issue an injunction.

23. Q. Then the case goes up to the High Court?—Frequently.

24. Q. These *pains* are little channels leading out of *nul-lahs*, I suppose?—Leading from the rivers.

25. Big and little?—Yes.

26. Q. Does the zamindar put a *bund* partially across the *nullah*?—It is not necessary at all. (The witness illustrated his meaning to the Commission.)

27. Q. Is the zamindar allowed to put a *bund* across a *pain*, or partially across it?—In many cases they have acquired what is called a prescriptive right to do so; but if any zamindar were now to *bund* up a *pain*, where it has not been the custom to make a *bund* hitherto, the other proprietors would at once go into Court and get it broken down.

28. Q. (Mr. Muir-Mackenzie).—And do they, as a matter of fact, ever attempt to do that?—Very rarely. Occasionally they do. Only the wealthy zamindars are able to risk it.

29. Q. (The President).—Then I suppose the *ahar* does double duty in irrigating the lands and having its own bed irrigated? Is that so?—It is, Sir. An *ahar* fills in July and August and part of September. It is then easy to irrigate paddy and other crops, and as soon as the water is all used up, *rabi* crops are grown in the bed of the *ahar*.

30. Q. And to which is the greatest importance attached—to the paddy or the crops grown in the bed?—Paddy as far as my experience goes. No doubt a very excellent *rabi* crop is produced in the soil of the bed, but it is a very small one.

31. Q. Are wells kept up in the neighbourhood of these *ahars*?—I have not noticed that in the Gya District.

32. Q. (Mr. Muir-Mackenzie).—You don't find that people choose sites for their wells by preference in their neighbourhood?—No. *Ahars* are generally made at a distance from the villages.

33. Q. And the wells are generally close to the village?—In my district, Gya, wells are only generally used in proximity to the villages—in what is known as the *dihans*. Well irrigation outside village lands is very rare.

34. Q. (The President).—Do you know whether any applications are made for advances to have *ahars*, *pains* or wells?—Ostensibly for this purpose there are numerous applications, but the greater part of the money is spent otherwise in such cases.

35. Q. Is there any system of *takavi* advances for wells?—There is no special system for wells.

36. Q. In your district does irrigation by wells occupy an important place?—No. *Pains* and *ahars* are far and away ahead. I calculated that about half the cultivated area in the district is irrigated from *ahars* and tanks. Tanks are very few in the Gya District, but nearly half, if not quite half, of the whole cultivated area of the district is irrigated from these *ahars* and tanks.

37. Q. And then how much irrigation is there from the *pains*?—I cannot exactly say.

38. Q. About a quarter?—Quite, perhaps a third. I would not be sure; I have not calculated this.

39. Q. Would there not be a feeling of confidence if you had a well for the *ahar* that in years of drought it would stand out better?—A well irrigates such a small area.

40. Q. Do you know how much it is in this part of the world?—A well will not irrigate more than 25 *bighas* here. The average area irrigated by wells is about 5 acres.

41. Q. Is that all the year round?—Yes.

42. Q. (Mr. Muir-Mackenzie).—Does that mean a well of a single *mot* or more?—A well of one *mot* will irrigate about 5 acres.

43. Q. (The President).—Do you think any assistance is to be rendered to irrigation by a more liberal system of *takavi* advances?—I don't think it is a satisfactory system. I don't think it would be satisfactory.

44. Q. And why, please?—Because these advances are, as a general rule, not spent on those works for which they are ostensibly taken.

45. Q. And can they not be looked after?—It is very difficult to ensure control, especially where you have got a large number of advances. It is impracticable in fact.

46. Q. Would it be worth while to have a special officer or some one under the Collector for this purpose?—I don't think so. I would not advise it. I would depre-

into any further special establishments. They are only a source of harassment.

47. Q. Do you think it would be a good thing to have a special officer going round the district giving *takavi* advances?—I think that would be useful. Even in my district, I think, it would be useful to have a special officer going round and giving advances.

48. Q. (Sir Thomas Higham).—What would it be spent upon?—On the making of wells, repairs of *ahars*, cleaning out of channels, *pains*, etc.

49. Q. (Mr. Muir-Mackenzie).—I don't quite understand why you push the advances so much in Gya if you deprecate the extension of the system?—I don't deprecate the extension of giving advances. I deprecate the appointment of a special establishment.

50. Q. (The President).—I see you say in your note that "a system should be introduced by which sanction to the grant of advances could be more promptly given and the cash paid personally by a gazetted officer at convenient centres." You see no other practicable way of doing it or any better way than this?—I think it is one of the means to the end that we want to attain.

51. Q. (Sir Thomas Higham).—You speak of one canal that you have in continuous flow; that you call the Patna-Gya Canal?—Yes. That is one of the branches of the Sone system. It irrigates a comparatively small area in the Gya District.

52. Q. And on the Sone Canal do they take the rents in *ahars* of produce (*bhaali*)?—In some parts, but the rents are generally cash in canal-irrigated areas.

53. Q. Do you think, as regards the water-rates on the Sone Canal, more might be taken from the occupants?—I think that the compensation from the canal irrigation in the way of additional produce is more than what they pay for the water. More could be taken perhaps from them.

54. Q. In the case of the non-occupancy tenants there is no limit to the power of the landlord to raise the rent. Is there?—There is a limit. He would have to go to Court, I think.

55. Q. Can landlords enhance the cash rents on their non-occupancy tenants?—There are provisions of the law by which they can.

56. Q. Have they risen in consequence of the water advantages?—Yes, very largely.

57. Q. Would not that point to the fact that occupants' rates are not as high as they might be?—I will not say that they are increasing now on those lands which have reached their full degree of productiveness.

58. Q. There is more competition in the way of applications for water now than there was formerly?—Certainly.

59. Q. So that if the rate was raised people would still come forward and want the water?—I think they would.

60. Q. You have very strong views as to the rates being too low?—I will not say they are too low.

61. Q. You say that the cultivation in the district depends on the tanks and *ahars*?—Half the artificially irrigated cultivation.

62. Q. That includes the *pains* too?—No.

63. Q. What proportion is dependent on the *pains*?—Mr. Muir-Mackenzie also asked me that question. I am not in a position to say exactly, but I should say one-third roughly.

64. Q. One-third of the artificial irrigation?—Yes. 60,000 acres are, I think, irrigated by the canals.

65. Q. You say that one reason for preventing the construction of new *pains* is that the holdings have become very much smaller, and that the land-owners have much less power. Supposing that could be got over, would there not be an objection on the part of all the owners of existing *pains* to any new ones being constructed. Would it be possible to construct any more without interfering with existing rights and privileges?—Yes, it would. There are some streams from which no *pains* have been taken off at all as yet.

66. Q. There are some?—Yes. There are some places, moreover, high up the streams where a *pain* might be taken off and no objection would be raised.

67. Q. Then there is room for the extension of *pains* if you get over this difficulty? There is room for still more important improvement in the way of repairs to, and maintenance of, existing *pains*.

68. Q. Because the present owners will not combine?—*Mr. C. E. A. W. Oldham.*

69. Q. Does one *pain* irrigate many independent holdings?—A *pain* may irrigate a hundred or two hundred villages or more; that is to say, a large *pain* would.

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70. Q. And there is no way of enforcing the clearances among such a number. Is there no power for management—no *panchayat*?—None.

71. Q. Then who is supposed to take the initiative?—The zamindars. It is their business. The system in Gya is the *bhaali* system of rents which theoretically entails upon the zamindar the duty of maintaining these works of irrigation. That has been the custom from time immemorial. There is no law on the subject; some legal provision is required. The Collector cannot interfere at present, but he ought to be able to.

72. Q. When you have a number of zamindars, it simply depends upon their powers of co-operation?—Yes.

73. Q. Can any external influence be brought to bear upon them?—No legal influence.

74. Q. Only personal?—The days for that are in fact departing too.

75. Q. For that you say you would require legislation; would you not?—Certainly. It cannot be done without legislation.

76. Q. To whom would you entrust the duty of enforcing their upkeep?—To the Collector.

77. Q. Not the District Board?—No.

78. Q. (Mr. Muir-Mackenzie).—Why do you object to the District Board?—Because it is a Board.

79. Q. (Sir Thomas Higham).—Do these *ahars* have an excess of water coming into them?—Occasionally.

80. Q. Is that not a common trouble?—Fairly common, but they ought to have, and nearly always have, an escape.

81. Q. Do they have an escape big enough?—If it is not big enough, of course the *ahar* may burst.

82. Q. Are they ever filled from the *pains*?—Yes, sometimes.

83. Q. You may fill one and then the rains come down and it overflows?—Yes, that is possible.

84. Q. I suppose they belong to the same owners as the *pains*?—Sometimes.

85. Q. There is no question of paying for having them filled up?—No. *Ahars*, you will understand, are pre-eminently suited for the higher lands where *pains* cannot go. *Pains*, as you understand, can only follow the valleys of the streams, but *ahars* are intended for the high lands—what are known as *tanr* lands in the Gya District where *pains* cannot reach.

86. Q. Is there room for making more of these *ahars*?—Yes.

87. Q. What do they want, money advances, or somebody to give them a lead?—Money, enterprise, education.

88. Q. Do they make many new ones now?—New *ahars* are occasionally made.

89. Q. You could not give any idea as to the numbers?—No.

90. Q. I suppose you have never had famine in the Gya District, have you?—We are supposed to have had it in 1873-1874.

91. Q. Have you got any programme for works there?—Yes.

92. Q. What sort of works?—Roads, tanks.

93. Q. Irrigation tanks?—Tanks which would be used both for drinking and irrigation.

94. Q. Would it be possible to employ famine labour in clearing these *pains* out and putting them all to rights, or would that be objectionable, as bring private property?—It might lead to disputes.

95. Q. Would the owners be able to employ labour in that way?—No doubt they would, but we would be doing work for private persons, not for the public.

96. Q. That is better than doing work which is useless?—We do not do work that is useless. Tanks are not useless, nor are roads useless.

97. Q. You have plenty of useful works to employ your labour?—Certainly.

98. Q. You employ labour that you have on roads?—Yes, and tanks of which we are not likely to have a large number.

Mr. C. E. A. 99. Q. You propose to put in masonry heads to these *W. Oldham* *pains*?—I think that is a very urgent necessity.

24 Oct. 02. 100. Q. Would there be any great objection on the part of the owners to that?—There would be some objection no doubt, but it should be overruled. Great distress is being caused by the non-existence of such head-works.

101. Q. Would they welcome heads like that to prevent damage, or would they regard it as a means of reducing supply?—The latter. They would not welcome it.

102. Q. Would you propose to make them even if the objection exists?—I would give them the option of doing it, and if they did not, I would have it carried out and recover the cost from them.

103. Q. You would do it at their expense?—Yes.

104. Q. (*Mr. Muir-Mackenzie*).—With reference to land improvement loans during the last five years, I notice that the largest number was made in 1896-97—107. Can you tell me the amount?—No, but Rs. 1,04,000 was spent on irrigation works alone—wells, tanks, irrigation channels and reservoirs.

105. Q. About a thousand rupees a loan?

106. Q. (*Mr. Allen*).—Rs. 1,04,550 was spent.

107. Q. Were the loans as large as that?—That was exceptionally heavy.

108. Q. Take 1898-99?—There were 18 loans and Rs. 15,135 spent.

109. Q. That again is nearly a thousand rupees a loan. To whom are they generally advanced?—There are two kinds of advances. Those figures represent only the Land Improvement Loans Act. Advances are made both to zamindars and *rayats*, for improvements to zamindars, under the Agriculturists' Loans Act to cultivators; very rarely to cultivators under the Land Improvement Loans Act.

110. Q. Is tenure any obstacle?—No.

111. Q. Then why do you advance so rarely?—They take their loans under different Acts.

112. Q. But if a *rayat* wants to make a well, cannot he take it under the Land Improvement Loans Act?—He can if he likes.

113. Q. That hardly seems in accordance with the intentions?—No doubt, cattle, seed and other things are the objects. I do not recall any case of a *rayat* applying for a loan for a well.

114. Q. Is that because he does not want it or because of the difficulties of getting it?—I cannot say.

115. Q. Are there any difficulties on account of his tenure?—No, so long as the security is sufficient. If he has a large cultivation, he can get a correspondingly large loan.

116. Q. And occupancy rights?—We do not make any hard and fast rule. Occasionally loans are given even to those with non-occupancy rights.

117. Q. Is there any difficulty as to the availability of the security that the *rayat* can afford?—No. It means delay, but there is no great difficulty. There is delay on account of the inquiries to be made by the subordinates of the Revenue Department.

118. Q. Can that be obviated by any change of system?—If an officer were deputed to go into the district where it was thought advances might be required with full powers from head-quarters to give loans up to a certain limit.

119. Q. Have no officers such powers at present?—Officers in charge of Sub-divisions have these powers.

120. Q. Do not they exercise them?—No, not in my experience. Applications for loans come into the head-quarters of the district or sub-division.

121. Q. And head-quarters are often far distant from the applicant's abode?—It is not altogether the distance. The serious difficulty is the obstacles created among the *mohurirs*, and until the applicant gives 10 per cent. to the men who deal with the loan, that loan is not given; some difficulty is raised.

122. Q. Is no alteration needed in the period of repayment of the loan or lowering of the rate of interest?—I do not think it is necessary to lower the rate of interest; it is already low.

123. Q. What period of repayment is usually fixed?—Agriculturists' loans are usually repayable in three years.

124. Q. And Improvements Loans?—It depends on the amount. Ten to fifteen years, very seldom fifteen years. The law allows up to twenty.

125. Q. I think the law allows repayment up to thirty years. The rules say twenty years, but they often restrict the law on this point. Would you be prepared to go up to twenty years?—No, not beyond ten years.

126. Q. Why do you prefer the short period?—I think the men are fully able to pay within that period.

127. Q. If you allowed a longer period, would you be able to give loans to somewhat poorer class of men?—We might, but I do not think it is a matter of much importance.

128. Q. Did you in the year of scarcity advance any considerable sum for the construction of *kachcha* wells?—No, it was not necessary. Last year was the only year of apprehended scarcity during my tenure of office.

129. Q. Have you ever been confronted with the difficulty that a security that is offered is subject to a prior encumbrance?—Occasionally, not frequently.

130. Q. A witness said that he considered that landlords might with advantage be given more facilities to secure an enhancement of their rent, justifiable in consequence of improvements effected by them. Do you think that advisable?—I do not think any further facilities than are already provided by the Act need be given.

131. Q. He has to go to Court?—There are two ways—by contract and by suit.

132. Q. If the matter is substantially beneficial to the tenant, he would have no difficulty in getting enhancement by contract?—Not if he is a good landlord and the tenant is reasonable.

133. Q. It would be dangerous to grant further facilities?—I think it would be wrong in principle.

134. Q. Why, if the improvement is a good one?—I regard it as primarily the duty of the *rayat* to improve his land. It is chiefly the result of the peculiar system of the district which imposes that duty on the landlord. I should like to see the abolition of the *bhaoli* tenure in Gya, and nothing but cash rents.

135. Q. Do not you think that the landlord has the advantage of a good deal of capital which would otherwise lie, to a certain extent, idle? Could it not be usefully employed in improving the land?—It could be usefully employed in that way.

136. Q. Another witness said that if irrigation could be introduced into a district like the Bhabua Sub-division, that the people, including, I understand, the zamindars, would not object to the introduction of a general cess?—I do not agree with that opinion. I think they would strongly object. They would regard it as a violation of the permanent settlement. Also the advantage would not be commensurate with the cess levied.

137. Q. Do you think that, in spite of that objection, it would be justifiable to impose such a cess if Government were convinced that the advantages were commensurate?—I think it would.

138. Q. Do you think the advantage could be made commensurate?—That is a matter for professional opinion.

139. Q. Supposing a tract very imperfectly provided with facilities for irrigation were by means of a protective work placed in as good a position as the Sone Canal area. Would that justify the cess?—Certainly. In my district, in consequence of irrigation, lands which once paid annas 8 are paying Rs. 5 to Rs. 7 a *bigha*, and one zamindar in particular told me that a village which once brought him in only Rs. 3,000 now brings him in Rs. 18,000. In such instances as that the imposition of a cess by Government would be justifiable.

140. Q. Another subject. Do *pains* occasionally lead into *ahars*?—It is not common. *Ahars* are intended for high lands which cannot be irrigated by *pains*. Occasionally a *pain* is led into an *ahar*; then only for conserving.

141. Q. Can more water be stored by the construction of more *ahars* for the purpose of receiving water from the *pains*?—Yes.

142. Q. With regard to disputes about the rights of water in different parts of streams, do you think it would be advantageous to frame a record-of-rights?—It would be an excellent thing. It is a proposal that has been frequently made by me in conversation, but it has never gone up to Government.

143. Q. Do I understand that you would enforce the payment for labour on *pains* by going to the Collector to undertake the repair and to charge the cost provisionally to the zamindars? Would it not be preferable to levy a cess

and that Government should do the repairs?—I would rather give the zamindar the opportunity of doing it. If Government were to levy a cess, it would mean getting a permanent establishment for the work, and our experience of establishments is that they are a source of harassment and annoyance to the people.

144. Q. There is no danger of the zamindars doing the repairs inefficiently?—If they did, the Collector should have it efficiently done. It would be for him to see if efficiently done.

145. Q. He would require an establishment for that, I suppose?—Yes, it would require an increase in the subordinate executive, but not a very large or unmanageable increase.

146. Q. Zamindars, in many cases, would not comply with the orders of Collectors?—Not, if they know that the Collectors have authority behind to enforce them.

147. Q. As for commutation of *bhaoli* lands, would you not fear that the people would dislike cash rents?—They would welcome them.

148. Q. Do they not find that a produce rent serves them better, having reference to fluctuations of the seasons?—In the case of some zamindaris, but not as a general rule.

149. Q. In the matter of *pains*, do you not think it a good thing that Government should take over the management of even some of the very large *pains* for irrigating a hundred villages for instance?—The experiment might be tried.

150. Q. (Mr. Rajaratna Mudaliar.)—In the case of the zamindar whose revenue you said increased from Rs. 3,000 to Rs. 18,000 from the introduction of canal water does he pay a proportionate increase of the water rate?—That I cannot tell you. The rate is primarily paid by the cultivator, but the custom varies. In some cases the zamindar pays half; in some cases nothing.

(Mr. Allen.)—In some cases the landlord is allowed to collect from the tenants.

151. Q. What is your security from non-occupancy tenants?—His cultivation, his non-occupancy right. It is usual in such cases to grant a loan to a combined number of tenants, who are mutually responsible.

152. Q. Where an occupancy tenant constructs a well at his own expense, does the zamindar demand an enhanced share of the produce or raise his money rent?—Where produce rents are in force, a certain proportion of the actual produce goes to the zamindar. So that if by constructing a well a rayat's fields produce a larger quantity the zamindar naturally gets the benefit.

153. Q. Does not that tend to deter the rayat from constructing wells?—So far as I know it does not.

154. Q. As to prior encumbrances, we get certificates from the registration officer for which no charge is made?—We don't get certificates.

155. Q. In other parts of India the tenants contribute labour to keep certain channels in repair. Does that custom prevail in zamindari estates in these provinces?—That is a common practice in the Gya District. As a general rule, the rayats carry out these works themselves.

156. Q. Unpaid?—In the better governed estates they are paid and in the Government and Wards' estates of course.

157. Q. Has the zamindar any power to enforce such customary labour?—I know of none.

158. Q. (Mr. Muir-Mackenzie.)—What is *goam* labour?—That means turning out in a body to repair a breach for instance.

159. Q. (Mr. Rajaratna Mudaliar.)—Would legislation be necessary in the direction of enforcing such customary labour?—There is no necessity for it.

160. Q. Have not these *pains* been repaired by village labour from time immemorial?—I believe so. In *bhaoli* districts it is primarily the zamindar's duty, and I would enforce the execution of that duty.

Mr. C. E. A.
W. Oldham.
24 Oct. 02.

161. Q. The original construction is borne by the zamindar, but the subsequent maintenance is shared between the zamindar and the tenants?—That is the principal system in vogue in the Gya District. It is regarded as the duty of the zamindar to maintain these works in a proper state of repair.

162. Q. It would be regarded as the duty of the zamindar were there a record-of-rights drawn up to-morrow?—That would depend upon the Settlement Officer. I should certainly suggest it.

163. Q. (Mr. Rajaratna Mudaliar.)—Suppose *pain* got out of order, has the tenant any right against the zamindar in the Courts under the Tenancy Act?—Not that I know of.

164. Q. Mr. Mylne said that the zamindars had no facilities for enhancing rents even in cases where they carried out improvements themselves at their own cost. Do you accept that?—No, I would refer you to the Bengal Tenancy Act.

165. Q. In granting loans do you give them in instalments or in one lump?—In instalments for Land Improvement loans.

166. Q. (Mr. Muir-Mackenzie.)—How about Wards and Government estates have you made any improvements or *ahars*?—Many, and we have been able to extend irrigation.

167. Q. (Mr. Allen.)—Would you look at the preamble to the Board's rules for the Agriculturists' Loans Act? There is a distinct intimation to district officers there that they are not to supersede the mahajans. Has that any effect in restraining Collectors from disbursing money under that Act?—Very little.

168. Q. Under the Lands Improvement Act rules I think there is no power for Sub-divisional Officers to disburse loans, and under the Agriculturists' Loans Act they have power only on delegation from the Collector?—Such powers are always delegated. My Sub-divisional Officers have powers under the Lands Improvement Act also.

169. Q. (Mr. Rajaratna Mudaliar.)—Concerning a general cess to be levied on account of irrigation, have you not known a tenant pay more than his share?—Yes, I have not known cases where he pays more than the landlord pays to the Government, but I have known many cases in which he pays the entire cess. He ought to pay half.

170. Q. Have you no power to prevent it?—We are powerless to prevent it. The rayats, as a rule, acquiesce in such action.

171. Q. (Mr. Allen.)—You spoke of the commutation of *bhaoli* tenure into *nakdi* on a large scale. Would not there be a difficulty in getting the tenants to combine to keep up their *gilandazi*?—If it were done on the lines I suggested, there would be no difficulty whatever.

172. Q. But the legislation you proposed had reference to *pains* to large works? You would not propose legislation in order to keep up *ahars*?—Yes, certainly I would.

173. Q. (Mr. Muir-Mackenzie.)—Would you not require a very large inspecting staff?—Not necessarily. Rayats would soon complain if a landlord were not maintaining his *pain* and proprietors also. It would come to the knowledge of the Collector, and he would know when to depute an officer. It would not require a standing army of inspecting officers.

SECOND DAY.

Bankipore, 25th October 1902.

WITNESS No. 0—RAJ BANADUR BAIJ NATH SINGH of Gya.

(To President in vernacular.)—Rice is grown entirely from *ahars* and *pains*. Disputes regarding the distribution of water are frequent. It would be a good thing if decisions regarding them rested with revenue officials, who

are experienced in such matters. There should be a right of acquisition of land for private irrigation works, but care should be taken that no injury is done to the adjoining lands.

Rai
Bakdar
Baij Nath
Singh.

25 Oct. 02.

WITNESS No. 10.—BABU MAKHAN LAL CHATTERJI, Deputy Collector, Shahabad.

Babu
Makhan
Lal
Chatterji.

25 Oct. 02.

1. Q. (The President.)—I am the Sub-divisional Officer of Bhahua. I have been there for a year and nine months.

2. Q. Where were you before?—In Gyn.

3. Q. During your time was there any distress for want of water?—Yes, last year there was a scanty rainfall, for which there was apprehension of scarcity, but there was no scarcity.

4. Q. Can you make any suggestion as to what can be done to help the people there as regards water?—Yes. There are four or five rivers which come from the hills, and if they were harnessed, it would do immense good to the people there; the Karamnasa, for instance.

5. Q. Would people be willing to take the water every year, or merely at times when the rains were scanty?—Every year, just as they do at the Sone Canal.

6. Q. It would be a very costly work to make a bund on a large river like the Karamnasa. Would the people be willing that a cess should be laid upon the land of two or three annas an acre on the whole of the land protected—that is a sort of insurance against famine?—I do not think they would accept that. They would be perfectly willing to pay the cost of the water they need, but over and above that any cess would not be welcome.

7. Q. And would they pay as much water rate per bigha as they do at the Sone Canal?—Yes.

8. Q. In your Sub-division is the land generally fit for irrigation?—Yes.

9. Q. Have you any black soil there—heavy soil?—There is a blackish soil called *kareel*. That is fit for paddy cultivation.

10. Q. And in the plains is there any soil unfit for cultivation at all?—No, almost every inch of land in the Bhahua Sub-division is fit for cultivation.

11. Q. Is the cultivation carried on now by means of *pains* and *ahars*?—There are *ahars*, but no *pains*. They are not many.

12. Q. Why is that?—Because the people are poor.

13. Q. Do not the zamindars make them?—The zamindars also are poor.

14. Q. What is the usual system of rents?—*Bhooli*.

15. Q. Suppose the engineers think the Karamnasa scheme too expensive to make, what could you do to encourage the making of *ahars*? Do you think that Government advances should be given?—I do not think that people would take Government advances readily. They have not done so for the last 10 years, except in 1875-1890 and 1896-1897, when there was actual famine. They think they will not be able to pay afterwards, for they are not certain that they will have good crops.

16. Q. I suppose it means going to the head-quarters of the district; or can you give advances?—We can if the Collector delegates his powers to us. An officer gets these powers as soon as he asks for it.

17. Q. Have you no well irrigation?—Very little. It is not the custom in the Sub-division.

18. Q. Is much *rabi* grown?—Yes—wheat, sugarcane, poppy and barley.

19. Q. The wheat and the barley, I suppose, get on with the rain?—For these also they want irrigation.

20. Q. Why should they not do it with wells?—That is not the custom. It is also expensive.

21. Q. Is the water very deep below the surface?—Not very deep, but they use wells only for poppy and cane.

22. Q. A well keeps water going for a much longer time than an *ahar*?—Yes, but they will not take to it.

23. Q. (Sir Thomas Higham.)—Do they grow much poppy?—I suppose about 20,000 acres.

24. Q. And they depend now entirely upon the rain?—Yes, and wells.

25. Q. They get good crops now: why would they take water from a canal?—If they got sufficient water, I suppose they would be able to irrigate more land.

26. Q. But would they ever want the water for *rabi*?—Not in good years; but the good years are so very few. For the last ten years, I suppose, there have been only two or three good years.

27. Q. Would they pay a cess for the sake of having a canal if the land-owners guaranteed to contribute? It would be a great safety for them?—I think they would guarantee that they would take the water, but they would not pay a cess.

28. Q. But suppose it is a very wet year, they will not take it and will not pay for it. Will they guarantee to pay for it whether they use it or not?—The lease system covers them. In one portion of my sub-division, in the north-east corner, there is an area of about 17,000 acres which is irrigated by the Sone Canal, and they have never refused to take water for the *khari* as well as for the *rabi*.

29. Q. Sometimes the people do not take the water at all for the *rabi*; how do you account for that? There are 120,000 acres of average *rabi* on the Sone Canal, and sometimes it falls to considerably less?—But we have 70 or 75 per cent. of paddy land in our Sub-division. They would always take it for paddy. And they would take it for *rabi* too, for in every village there is both paddy and *rabi* land.

30. Q. (Mr. Muir-Mackenzie.)—At first water seems to have been taken up rather more sparingly in the earlier years than in the later on the Sone Canal. Would the same sort of thing take place in Bhahua? Would they hesitate to take water?—No. They are anxious to have it. They have seen their neighbours taking water and the advantages they have derived from it.

31. Q. Have you generally asked for powers for *takari*?—Yes. This year I granted loans to some tenants.

32. Q. How many altogether?—About Rs. 240 or Rs. 250, each loan amounting to about Rs. 5. That is for seed and cattle. There is no demand for *ahars* or wells or works.

33. Q. Have you ever tried to create a demand?—As far as I could, but they would not listen.

34. Q. What about the disbursement of these loans? Did you take the money with you and disburse it on the spot? The tenants came to the head-quarters of the Sub-division and I disbursed the amounts myself to them.

35. Q. Do not you think you could have got rid of more money if you had disbursed it in camp?—Yes; but these were all Government estate tenants. I have not advanced outside that this year; only in the famine year.

36. Q. Having taken a loan in the famine year, might not the people have been more disposed to take it even than before the famine?—At any rate they did not come.

37. Q. The famine has made no difference?—No.

38. Q. (Mr. Karamates Mudaliar.)—Do you think the tenants preferred to borrow from *mahajims*?—I do not think they did either.

39. Q. (Mr. Muir-Mackenzie.)—Is there not much indebtedness?—There is, but they are indebted to the zamindars.

40. Q. (Mr. Rajaratna Mudaliar.)—Do the zamindars lend out large sums?—They do not lend out much money; they advance for seed and cattle.

41. Q. Supposing a lakh of rupees were placed at your disposal and you were allowed further powers to grant loans, would you be able to push them?—I do not think I should be able to distribute all that money. Last year I tried to induce several zamindars to take loans, because there was apprehension of scarcity, but they would not come for them.

42. Q. Is there scope for improvements for *ahars* and *pains* in your Sub-division?—Not for *pains*; *ahars* might be increased, but the zamindars are so very poor that they hesitate even to take money from Government, as they are so uncertain of crops.

43. Q. But it is principally in such cases that the construction of *ahars* would be advantageous?—But it is not the custom.

WITNESS No. 11.—BABU CHITTER BHAI SAHAI, Zamindar, Shahabad.

Babu
Chatter
Bhai Sahai.

25 Oct. 02.

1. Q. (The President.)—In what part of the district are your lands?—In Piro, Nancour, Panwar and Arrah Pergunahs.

2. Q. Are these districts irrigated by the Sone Canal?—Largely.

3. Q. Have you any land in the unirrigated part of the district?—Yes.

4. Q. Is the difference very great in the value of the land where it is irrigated and where it is not?—It is. I cannot give any exact figures.

5. Q. How much?—A great part of my district is *guzashta* lands, holdings for fixed rents or occupancy holdings. There is very little chance of an increase of rent in such cases where the *nakdi* system prevails, whether the land is irrigated or not. But in *bhaoli* tenure the benefit is shared both by landlord and tenant.

6. Q. But where the *nakdi* system prevails, does not the landlord obtain any benefit?—Not where there is *guzashta*. In one sense it means land which rayats have had from the time of the permanent settlement, and another sense of it is occupancy rights, having a field more than 12 years.

7. Q. Suppose canals were made in the Bhabua Sub-division, do you mean to say that the zamindar will not be able to get a higher rent for his land?—Not where there is *nakdi* with *guzashta* right. Of course the bulk of the land is *bhaoli*.

8. Q. Do the Sone Canal arrangements work satisfactorily generally?—Yes.

9. Q. Can you suggest any improvements?—I have heard from my own tenants that they were not able to get water; not that it was refused, but that the authorities could not grant applications.

10. Q. Do any of your lands depend upon *ahars* or *pains*, and not upon the Sone Canal?—There are no *pains* in Shahabad District at all. There are *ahars*; some in fairly good condition; others neglected; the latter in Bhabua mostly, where irrigation works are urgently wanted.

11. Q. Is that because of the poverty of the rayat or laziness?—The properties are always being put up for sale for arrears of Government revenue.

12. Q. Would not these men derive benefit by borrowing money from Government?—They do not appreciate that much. There are difficulties in receiving it in time and the uncertainty of having good crops and their inability to repay with ease. It may be a losing concern after all.

13. Q. Do you think the system of recovery is too severe?—It is not at all suited to the people of Bhabua.

14. Q. Can you suggest any change in the system?—I am not a believer in the *takavi* system at all.

15. Q. (Mr. Muir-Mackenzie.)—Can you tell me whether the *nakdi* system was generally in force over the Sone Canal area before the Sone Canal was opened?—In my estates the *nakdi* system largely prevails. The management was not in my hands before the Sone Canal was opened and since my time there has been little commutation. The people prefer the *bhaoli*.

16. Q. Where *nakdi* rents prevail the landlord has extreme difficulty in procuring any enhancement of rent?—Very great.

17. Q. Is he on that account deterred from making improvements?—Certainly.

18. Q. Section XXX, clause (c) of the Tenancy Act, says that the landlord of a holding on a money rent may institute a suit to enhance the rent on the ground that the productive powers of the land have been increased by an improvement effected by or at the expense of himself?—Then that has to be established to the satisfaction of the Civil Courts.

19. Q. Is that a difficulty?—Yes.

20. Q. Whence does the difficulty arise? If a landlord constructs an *ahar* and he is able to show that it greatly increases the yield of the land, that ought not to be a very difficult point to prove?—If the *ahar* be new altogether, it will not be a difficult matter, but only in cases of throwing up earth-works or making *gilandazi*, the tenant will say that it is the duty of the landlord to keep up repairs and for simply doing his duty he is not entitled to any enhancement.

21. Q. Would you prefer to see any power given to the Collector to regulate such cases?—Yes, because from my own experience I can say that if one has the papers of the Collector, it is not difficult to prove the improvement in Court.

22. Q. The amount you can demand has not been much increased by the introduction of the Sone Canal, but has it not been made considerably more secure? You have much less difficulty in realising the rental than before?—Certainly.

23. Q. What is your great objection to the *takavi* system?—The full amount does not reach the tenant. I should not be surprised to hear that not even a quarter has gone into his pocket.

24. Q. It sticks on the way?—Yes, in various places. Then, again, the feeling of uncertainty as to the crop.

Ben.

25. Q. Any other objection?—It may be that the money that the rayats borrow is sometimes used on other objects than irrigation purposes, and then they are liable to have it summarily recovered.

26. Q. Do your tenants depend on you for advances for seed and cattle?—No, because my tenants are in the canal area, and do not require it, being well off.

27. Q. Do your tenants make wells at all in the irrigated lands?—Very seldom.

28. Q. If they did, would not they be able to supplement the canal water usefully?—I am afraid not. Irrigation by wells is not known in Shahabad; it is not suited to paddy cultivation, and only to a very limited extent for *radi*. It is not the having a well that will surmount all the difficulties. The cost of working is enormous. You will have to hire bullocks and incur other expenses.

29. Q. Is there no well irrigation for valuable crops?—For poppy, yes; very freely.

30. Q. Is the canal not used for it?—Not much.

31. Q. (Mr. Rajaratna Mudaliar.)—Supposing the loans were disbursed through the zamindars, would not that remove the difficulties to which you refer?—Matters would be worse.

32. Q. Could not the zamindars be trusted to see that the tenants got the full value?—The majority of zamindars are not educated enough; they do not understand the duty they owe to Government and to the *rayats*. That would be a very bad step.

33. Q. There is said to be difficulty in getting the Courts to grant higher rents?—For old works. It is the duty of the zamindar to maintain irrigation works in an efficient state of repairs. There have been no new improvements. But if the tenants enter into a contract respecting repairs, there is no difficulty.

34. Q. Under the *bhaoli* system does the zamindar pay any portion of the water-rate to Government where the works are constructed by Government?—Yes, when a joint application is made both by the landlord and the tenants the landlord is bound to pay.

35. Q. But in nine cases out of ten the zamindar will not join in the application?—Yes, but frequently now the tenants recover half the portion from the zamindar privately. So far as I know zamindars do pay, but not to the canal authorities.

36. Q. If the zamindar refuses, can the tenants recover?—Yes, for good done to the zamindar, under section 70 of the Contract Act.

37. Q. Does the tenant contribute any portion of the cost of repairs to *ahars*?—By contributing labour in some places, by the labouring classes, not Brahmans and Chhatris.

38. Q. Have you any power to enforce this customary labour?—No, but they think it is to their advantage to repair *ahars*; and there is no difficulty at present.

39. Q. (Mr. Allen.)—Is there any custom in Shahabad before a *rayat* makes a well of paying *salamti* to his landlord?—I do not know of any instance, but I should not be surprised to hear of an unscrupulous landlord demanding it.

40. Q. (Mr. Rajaratna Mudaliar.)—It is not a case of unscrupulousness; it is a *nazar*, a mark of respect.

41. Q. (Mr. Allen.)—And for taking so much land.

42. Q. (Mr. Rajaratna Mudaliar.)—In your own estate do you pay any portion of the water-rate?—I have paid in some cases.

43. Q. (Mr. Allen.)—Your tenants have not applied for the commutation of *bhaoli* rents. Is that due to the fact that they have to pay no portion of the water rate?—Not so; but because they pay according to the yield, taking the risk of good and bad years.

44. Q. As regards the zamindars of Bhabua?—They are very poor. They have been sold up. They have become poor by extravagance, and enormous amounts are spent in marriages and deaths.

45. Q. How do they compare with those of the Sone area?—They are worse off.

46. Q. Is it not because they do not get their rents in so well?—That is one reason.

47. Q. About landlord's improvements; under section 88 he can register an improvement?—Yes, but they do not do that largely; mostly on account of ignorance of the prevailing law, and also because they do not take the trouble and do not care.

Dabu
Chatter
Bhuj Sahai.

25 Oct. 02.

Babu
Chatter
Bhuj Sahai.

25 Oct. 02.

48. Q. Have you ever known of a case in which a landlord has gone to the Civil Court to bring an enhancement on the ground of improvement and has shown a register of the improvement?—I think not.

49. Q. Would he have any difficulty in getting a decree if he could prove that his improvement was registered?—Not in that case.

50. Q. If a landlord can get a *raiya* to agree to an

enhancement of rent on the ground of improvement, he can do so by contract?—He can.

51. Q. And also before making his improvement come to an agreement with the *raiya* to pay an enhancement if the improvement is carried out?—Yes, and there is generally an understanding to that effect.

52. Q. As regards forced labour on *bunds*, is it customary for the zamindar to feed the labourers whilst working?—Yes, that is an equivalent of wages.

Copy of a letter from the Honourable Babu CHATTER BHUJ SAHAI, Arrah, dated Arrah, October 1902.

I was examined as a witness before the Commission on the 26th instant at Bankipore. One of the questions raised in my evidence was, whether there was any difficulty in obtaining a decree from the Civil Court on the ground of an improvement effected by the landlord. I stated that there was a great difficulty, and this statement was made having regard to the provisions of section 33 of the Bengal Tenancy Act which controls clause (c) of section 30 of the Act pointed out to me by one of the Honourable Members of the Commission. Each of the clauses of section 33 imposes a limitation on the question of the amount of enhancement and minimizes the measure and chances of success in a suit for enhancement of rent on the ground of an improvement. The difficulty is further enhanced by the provisions of section 50 of the Act, which enacts that the rent of a *raiya* shall not be increased if he has held the land from the time of the

permanent settlement without any variation in the rent except on the ground of an alteration in the area of the holding; and under sub-section (2) of the section it shall be presumed that he has so held if it be proved that he has held at a rent which has not been changed during the twenty years immediately preceding the institution of the suit. No doubt this presumption is rebuttable, but to rebut it is a Herculean task, and if he fails to rebut, there can be no enhancement, as the rent of only an occupancy *raiya* can be enhanced under the law and not of the *raiya* who is holding from the time of the permanent settlement. On these grounds I said in my evidence that enhancement on the ground of an improvement was attended with difficulty. I have the honour to request you to be so good as to lay this before the Commission for consideration.

WITNESS Nos. 12, 13 AND 14.—BABU NARSING SAHAI, BABU GOPAL SINGH AND BABU RAM BADAN SINGH, all zamindars of Sub-division Bhabua, District Shahabad.

Babu
Narsing
Sahai,

Babu Gopal
Singh and
Babu
Ram Badan
Singh.

25 Oct. 02.

1. (The President).—There are few *ahars* in Bhabua and they are in bad repair. The people are very poor and cannot afford to construct *ahars*. Both zamindars and *raiya*s are poor.

2. Q. Why do not they avail themselves of the power to borrow from Government?—Because they would not be in a position, they fear, to repay the loan, because if their crops fail, they will not be able to repay the loan.

3. Q. Is not that rather unreasonable? With a new *ahar* the people would be better off. Suppose the Sirkar takes it back in 20 years?—They fear that Government may not get their money back.

4. Q. But the *raiya* would get a lot back. If they had water by canal, would they take it every year?—Yes, they are greatly wanting water.

5. Q. And would they pay as high rates as on the Sonu Canal?—Yes.

6. Q. Suppose the Sirkar found it costs too much to make great canals for Bhabua, do you know of any way in which *ahars* could be encouraged?—There will be a difficulty in getting water, because the present proprietors will not allow water to accumulate in new *ahars*.

7. Q. (Mr. Blair-Mackenzie).—If *ahars* are made without any large weirs or canals, will they fill from the existing rainfall?—In most of the years, not.

8. Q. If they had water, would they greatly increase the *raiya* area?—Very much.

9. Q. Is there much waste land upon which they would grow it?—About one-eighth of the whole area. It would in that case be cultivated.

10. Q. (Mr. Allen).—The Karamnasa comes down in flood; does it not?—Yes sometimes.

11. Q. Does that interfere with your making *ahars*?—No.

WITNESS No. 15.—MR. UPENDRA NATH GHOSH, Deputy Collector of Arrah.

Mr.
Upendra
Nath Ghosh.

25 Oct. 02.

1. Q. (The President).—How long have you been Deputy Collector?—Since 1899.

2. Q. You must have moral about a great deal among the cultivating classes and heard a great deal of what they said. Are they contented with the canal management, or do they feel it hard upon them?—They are content.

3. Q. You make calculations on the measurements given you by the canal authorities, and you are under the orders of the Superintending Engineer?—Yes. Calculation of rates are made by Divisional Canal Officers.

4. Q. Are the measurements finished by the time the crop is ready?—Generally.

5. Q. So there are no disputes as to whether the land has been watered or not?—Very few.

6. Q. Are there many complaints as to incorrect measurements?—No.

7. Q. Is the canal irrigation popular?—Yes. It is apparent from increase of leases. In cases of long leases, seven years; it is increasing, that is, for paddy. The increase is striking in Arrah Division.

8. Q. (Mr. Blair-Mackenzie).—Is by far the larger amount of revenue collected in leases?—Yes, about one-third of the whole demand is in season leases, and nearly two-thirds in long leases.

9. Q. Do you think the rates could be raised?—I believe long lease rates could be raised, and that the people

would pay them. At present it is Rs 1-0 per *bigha*, or Rs 2-8 an acre. That will be raised in 1903 to Rs 1-14, which can be raised still.

10. Q. Is much water wasted?—No. With the season lease they utilize the last drop of water they get.

11. Q. Are the water-courses kept in repair?—Yes.

12. Q. Don't the carts cut into the water-courses and let the water flood into the soil?—No.

13. Q. (Mr. Rajanendra Mahalikar).—What is your present staff?—The present staff is a Deputy Collector in charge of the revenue division, two Sub-Deputy Collectors. There are 7 circles, and each circle is under a *zilladar* who supervises the work of collection, and there are 32 *talildars*. Each *talildar* is given two peons to make the collection. There are clerks and *mohurrirs*, peons, and an accountant for office work.

14. Q. What is the total area irrigated?—I have not got figures with me. (I voice: It averages about 450,000. Our rental last year was Rs. 10,69,500.)

15. Q. Would it not be possible to reduce the staff if the assessment is made over to you with a staff of amins for measurement?—The measurement and assessment can better be done by the staff that regulates the water. The water is regulated by the engineering staff. They know how much is irrigated, and it is better that they should measure and assess. The tenants are always likely to mislead me, and I must ask the engineer to correct them. That means they must have as much staff as they have at present, except eight or nine amins in each Sub-division.

rates regularly, the water is stopped. The greatest trouble is to realise from the petty zamindars.

19. Q. In Madras the collecting staff is not much P—I am not aware of the Madras system. In a compact area the collection can be made with less staff. The area of Shalabadi District alone is 4,000 square miles; excluding 1,300 square miles of Bhambra, which is not irrigated, the area to be traversed for collection is too large for the staff.

20. Q. What do you think if the collection is given to zamindars?—I did not try the system. All that I can say is that all zamindars do not pay their land revenue without the sun-set law being brought into use; collection of cess through them is not a success.

21. Q. What do you say to the transfer of the department to the Collector?—The department is working well as it is, as far as I can see. The Superintending Engineer himself shows anxiety for successful irrigation.

22. Q. Do you receive any complaint about supply of water?—Very seldom. The cultivators may be anxious for more water, but the supply given to them is sufficient to mature their crop.

(Replies to printed questions.)

I.

A.—GENERAL.

(7) No. I think the cultivators would be willing to pay enhanced rent or revenue if they had the security of their crops assured by irrigation.

(8) The provisions of the Bengal Tenancy Act are applicable in these districts. I have not heard of any complaint against this Act on the part of the cultivators: the zamindars, I believe, have objections to it.

Paragraph 6.—I do not think so. There is a very strong desire on the part of the people in these districts to have irrigation extended, but they do not quit their homes for the irrigated tracts, unless they are reduced to extreme poverty. Applications for irrigation leases for large areas have annually to be refused for want of water in the Sone Canals. In 1899-1900 applications for 40,412 acres were refused.

B.—CANALS OF CONTINUOUS ELONG.

Paragraph 7.—(1) In these districts, from rice-fields irrigated from the canals, a *paira* or catch-crop is invariably secured of *kesari*, linseed and gram: the value of the produce would range from Rs. 8 to Rs. 12 per acre.

(2) The sugarcane cultivation has been doubled since the construction of the Sone Canals: its extension is limited to the hot-weather supply available.

(3) (a) Ten per cent. :

(b) Thirty to fifty per cent.:

(c) Three to nine times the yield :

in fact, any unirrigated crops would yield nothing whatever.

Paragraph 8.—(1) Rs. 4 per acre.

(2) Rs. 20 to Rs. 30 per acre.

<i>Paragraph 9.</i> —(1) Long-term leases (mainly taken for <i>kharif</i>)	Rs. a.
<i>Kharif</i> season leases	3 8
<i>Rabi</i> "	3 8
" "	2 0
Hot weather (sugarcane)	4 0

These are the rates on the Sone Canals in 1901-1902 paid to Government by the cultivators of the land and paid for the actual area irrigated.

(2) The owners have no legal right to enhance the cultivators' rents on account of the canal irrigation, but undoubtedly they have done so, and rents for *nakdi* lands have been doubled and, in some cases, trebled in Shahabnād; where rents were formerly Rs. 3 an acre the cultivators now pay Rs. 6 and Rs. 9 on an average. The owners of *bhaoli* lands have, of course, participated in the increased yield of the fields due to irrigation.

(3) Nothing beyond the water-rates mentioned above is paid to Government.

Paragraph 10.—The water from the canals is brought to the fields through "village channels": these are generally constructed by the villagers arranging amongst themselves collectively. Where the villagers are unable to construct them, application is made to Government for their construction, the cost being defrayed by subscription.

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	Inches.		Inches.
April	0·15	October	2·61
May	1·13	November	0·29
June	6·80	December	0·21
July	12·11	January	0·82
August	11·82	February	0·56
September . . .	6·76	March	0·35

Average annual total = 43.61 inches.

Paragraph 3.—(1) Not in the plain tracts of these districts.

(2) No.

(3) For the cultivation of the staple foods of the districts the lands are not manured. Only valuable crops are manured, such as potatoes, poppy, sugarcane and vegetables.

(4) Generally the soil of these districts is suited to irrigation of either rice or *rabi*.

(5) Extension of irrigation in these districts would be dependent on the supply of the rivers: the supply in them is entirely dependent on rainfall: there are no snow-fed streams. The crops in these districts are mainly dependent on the storage of the rainfall and its favourable distribution. Rice is the principal crop and is the staple food of the people. The important periods when water is necessary for this crop are—

(1) from the middle of July to the end of August (the transplanting season), and

(2) from the last week in September to the end of October.

Failure of rainfall during either of these periods materially affects the outcome of the crop. During the last decennial period from 1890-91 to 1899-1900 the rainfall was for four years below average; and in two years of the remaining six, although above the average, the rainfall was unfavourably distributed.

(6) On the part of the cultivators there is a lack of capital for initial expenditure, and I do not think the zamindars would come forward with capital for carrying out any extensive scheme of irrigation. Where lands are under *bhaoli* or "crop-divisible" system the zamindars make *khars* and circuitous embankments to retain the rainfall for irrigation purposes: this is done more in the Gya and Patna Districts where large areas are under this system.

Mr. J. H. from the applicants; in these cases there is no recoupment. Where channels are constructed by zamindars or thikadars, village channel rent is realized by them, the rent being fixed by the Canal Officer.

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E.—WELLS.

Paragraph 34.—(1) Thirty feet.

(2) Percolation.

(a) No.

(b) Most probably.

(3) A well, 3 feet in diameter, with 10 inches steining and 36 feet depth, was made at a cost of about Rs. 60 to a villager in Arrah.

A well, 6 feet in diameter, with 10 inches steining, 42 feet deep, and iron rods driven down 50 feet into the soil, was made at a cost of Rs. 200 in Arrah by a villager.

(4) About 60 years, if well constructed.

(5) By (a) *latha*, or lever and bucket.

(b) *moth*, or leather bag worked by bullocks.

(6) and (7) From a 3-feet diameter well, as above, in which two *lathas* are worked, 10 *bighas* may be cultivated; from a 6-feet diameter well, as above, in which a *moth* is worked, 15 *bighas* may be cultivated.

Paragraph 35.—In these districts neither under (1) nor (2) are there difficulties; wells can almost everywhere be dug and constructed.

Paragraph 39.—Yes. A water-rate on the area commanded should be charged to recoup Government for the cost of construction.

Paragraph 40.—Yes. They irrigate from 2 to 3 acres by advancing a small sum to the villagers towards their construction.

II.

The Sone Circle extends over the districts of Patna, Gaya and Shahabad.

As regards Patna, the western portion is protected by the Sone Canals. In his report on the famine of 1896-97 the Commissioner remarked—

"No parts of this district were ever seriously in danger: the rainfall was not so deficient as elsewhere, and every available drop of water from the Sone Canals was utilised: Fears were at first entertained for the Islampur Thana in the Bhabua Sub-division, but these soon passed away."

The Bihar Sub-division again is divided into hills in the south and the low country to the north: the whole sub-division is intersected with streams, and the greater part is provided with a system of reservoirs (*akhars*), some of which are filled with rain-water and natural drainage, while others are replenished by damming the rivers. An elaborate system of conduits (*pyees*) conveys the water from the rivers to the reservoirs and again to the fields of the cultivators.

This district is extraordinarily well supplied with communications.

As regards Gyn, the Commissioner in the same report notes—

"Gyn was in even less danger of famine than Patna: the whole of the western border is protected by the Sone Canals, and almost all the remainder by the local system of reservoirs and channels above alluded to."

As regards Shahabad, the greater part of the plain portion is protected by the Sone Canals; the unprotected tracts lie south and west of the district in the Bhabua Sub-division and part of the Sasaram Sub-division. With reference to this district and these tracts, the Commissioner of Patna in his Famine Report remarks—

"18. This district also suffered from the general rise in prices, but owing to the stocks generally held, no part of it was really distressed except the extreme south-west corner comprising the Bhabua Sub-division and a part of that of Sasaram with an area of 1,301 square miles: this tract consists of two sharply defined portions—the hills and the plains."

19. The whole of the southern part of the Bhabua Sub-division, and much of the southern portion of Sasaram, is occupied by the Kaimor range of hills which cover an area of 700 square miles, with a population of about 20,000 persons, thinly scattered over an undulating plateau covered with forest for the most part. A great portion of this area

is occupied by Government estates. Here the crops are poor and precarious, and depend greatly on the rains, for with the exception of a few village wells, and still fewer tanks, there is no provision for a water-supply. Food-supplies are brought up from the plains through difficult passes which, always impassable for wheeled traffic, become closed even to pack animals when the monsoon once sets in. There was a serious failure of crops all through the hills, and it was feared that unless early steps were taken to bring plenty of grain on to the plateau, there would be real want of food: it was therefore arranged that the local market should be supplied in good time through a grain-dealer appointed by the Collector. Rents were suspended in the Government estates, and considerable advances were given to the cultivators both for wells and seed-grain: lastly, a little gratuitous relief was administered, and three relief works were opened for about three months. Owing to the showers in the cold weather, and probably from the existence of private stores, the people passed through the ordeal better than was at one time expected.

20. The remainder of the distressed tract in this district comprised the plains part of the Bhabua Sub-division and the Chenary outpost of Sasaram, and is again divided into two parts lying, respectively, north and south of the Grand Trunk Road. The part to the north was not severely affected, and test works which were started in October were abandoned by the end of that month, and not afterwards resumed. In the southern portion lying between the hills and the Grand Trunk Road the distress was much more acute. This tract is characterised by very poor soil, growing hardly anything but *aghani* rice, which in 1896 was a total failure; there is little or no irrigation. Moreover, the cultivators are inexperienced and impoverished, and the physique of the people is poor and their general condition bad. The grain markets of the sub-division, such as they are, are supplied either from Sasaram, some 28 miles from Bhabua along the Grand Trunk Road, or more largely from the Zamania station of the East Indian Railway, which is at the same distance from the same place. Relief works were opened here at the end of October and were continued till August 1897; much was expected from the Moghulsera Railway running along the north of this tract, the construction of which was commenced in 1895, but for various reasons it failed to attract employment. Owing to the failure of the Sub-divisional Officer of Bhabua to give early and complete information, the people ran down a good deal and relief works and gratuitous relief works were organised by the Collector in February, not a day too soon. Gratuitous relief was greatly curtailed by the middle of September, and ceased altogether by the end of that month."

With reference to paragraph (1) of the memorandum of points to be considered by the Irrigation Commission in Bengal for districts or tracts liable to famine or scarcity, I shall confine myself to supplying information as regards the Bhabua and Sasaram Sub-divisions which were affected in 1896-97.

(a) *Gross and cultivated area, average gross area annually under crop.*—This is shown in the following statement:—

Sub-division.	Gross area in acres.	Total estimated cultivated area in acres.	Approximate normal area under winter rice in acres.	Approximate area under winter rice in acres.	
				1900.	1901.
1	2	3	4	5	6
Sasaram . .	855,520	544,400	333,000	275,000	153,300
Bhabua . .	632,640	470,800	313,500	130,000	280,000

These figures are obtained from the final report on the winter rice crop of 1901 published in the Supplement to the *Calcutta Gazette* of 11th December 1901.

(b) *The probable proportions of the cropped area irrigated by Government irrigation works, by private or village works and by wells, respectively.*—About half the area of the Sasaram Sub-division is commanded by the Sone Canals; in the Bhabua Sub-division there are no Government irrigation works. I have no available information as regards the proportions irrigated by the other sources mentioned, but as noted in the Commissioner's famine report, these sources of supply are very limited.

(c) *General configuration of the country, character of the soils and their suitability for irrigation.*—The

southern portions of these sub-divisions are occupied by the Kaimor range of hills, covering an area of about 700 square miles, the plateau is undulating, thickly wooded; and sparsely populated. The northern portions from the hills to the Ganges present the ordinary flat appearance common to the valley of the Ganges in Bihar. These are extensively under cultivation and fairly planted with trees. The soil is chiefly alluvial; there is a considerable area of *keval* soil (a brownish black clay) in the affected tracts in which *aghani* or winter rice, the staple food of the district, is sown; but as it is dependent on rainfall, it fails or yields a very poor crop four out of seven years. If irrigation is provided, there is no doubt in my mind that it will be highly appreciated and much sought after, and that the experience of the Sone Canals will be repeated, *viz.*, that *rabi* lands will be converted into rice fields.

(d) *Extent to which cultivation is dependent on artificial irrigation; statistics of annual and monthly rainfall.*—As already stated, the rice (principal crop) fails or yields but a poor return in four out of seven years. Owing to the insufficiency of the rains, only small areas are under *ahars* (embankments thrown across the drainage lines) coming to maturity. The accompanying two statements show the monthly and annual rainfall

Appendices A, B and C. at the head-quarters of the Sasaram and Bhabua Sub-divisions for the last 21 years. It is curious to note that the average is almost identical. A third statement also is appended showing the rainfall at Basawan, midway between Sasaram and Bhabua, and lying about 8 miles further north.

(e) *Years in which reliable records show that there has been (1) famine and (2) severe scarcity not amounting to famine.*—There was famine in 1896-97 and, owing to the scanty rainfall, scarcity in 1888. There must have been a considerable failure of the rice crop also in 1883, 1887, 1891, 1892, 1895, 1898, 1899, 1901 resulting in the impoverishment of the people.

(f) *Staple crops for each main class of soil; times at which sown and reaped; what are the crops which require irrigation and how many waterings do they require and at what times of the year?*—The staple or main crops sown come under one of the following seasonal classifications:—

- (1) *Kharif*, *aghani* or winter rice;
- (2) *Rabi* or spring crop;
- (3) *Bhadai* or autumn crop includes autumn rice;
- (4) Sugarcane (perennial).

The lands are classed according to the crops they bear, *viz.*, (1) rice or paddy lands, (2) *rabi* lands and (3) sugarcane lands. *Bhadai* crops are usually grown on *rabi* lands.

Paddy lands are divided into two classes, *viz.*, (1) those sown in sandy lands (locally known as *bangar*, *bat* and *balmat*), and those sown in clayey and loamy soils (locally known as *keval*, *kerail*, *dorosa*). The former bear only one crop in a year, *viz.*, paddy; the latter bear a second or catch-crop in the spring, such as *kesari*, *gram* and linseed, etc., sown just before the paddy is out.

Rabi lands are of the clayey and loamy soils: that known as *kerail* is best suited to the growth of *rabi*. They are also divided into two classes; those which bear cereals only and those (the better lands) which are double cropped, *i.e.*, with an autumn (*bhadai*) crop as well, such as *marua*, *kodo*, *makai* and sixty-day rice (*serah sathi*).

Sugarcane is sown principally in the clayey and loamy soils known as *keval* and *dorosa*. The fields in which sugarcane is grown are sown with either one or the other of the seasonal crops for one or two years before being resown with sugarcane. The accompanying

Appendix D. table compiled for this circle shows the time of sowing and reaping, irrigation required and when of the principal crops grown in the country traversed by the Sone Canals.

(g) *Utility of irrigation in increasing the produce of the land and in securing it from the effects of a failure of the rainfall.*—The crops, especially rice, are dependent on the rainfall; and there can be no extensive cultivation of the rice crop or even the *rabi* or sugarcane crops unless some means are adopted to store the rainfall, and irrigate them at the most suitable and favourable times. Unless, therefore, some means of storage and artificial irrigation are adopted, the produce must be adversely affected. In the tracts under consideration the system of *ahars* or shallow surface reservoirs exists, but in years of scanty rainfall they run dry and a very small area, if any, is brought to maturity; this

failure of crop, as has been stated before, occurs probably four out of seven years. With a systematic scheme of irrigation, such, for instance, as the Sone Canals, and probably storage reservoirs, such as proposed for the Karmnassa and Durgauti rivers, with distributing channels, the produce of the land in these tracts will undoubtedly increase and security will be afforded in the event of failure of the rains. In the famine year of 1896-97 and in 1901-1902 it is estimated that, respectively, not less than 33 and 35 lakhs of maunds of grain were added to the food-supply of Bihar by the Sone Canals.

Appendices E and F.

Two tables are annexed showing the results of crop experiments from 1897-98 to 1901-1902 since a more systematic system of experimenting was introduced. In the case of rice the results are more favourable to the canals than in the case of *rabi*.

(h) *General measures which should be adopted for extending irrigation in each district, either by Government or private works.*—The construction of storage reservoirs in the Karmnassa valley and possibly also in the Durgauti valley, with a high level canal and distributing channels, are the works that suggest themselves for the irrigation of the affected tracts. The cost of carrying out these schemes would preclude their being taken up as a private enterprise; they would therefore have to be undertaken by Government.

Paragraph 2.—*Existing Government irrigation works (Imperial).*

The Sone Canals.—Particulars were forwarded to the Chief Engineer with this office No. 4043, dated 3rd October 1902.

Paragraph 3.—*Proposed new Government works, etc.*—There is the Karmnassa project and possibly the Durgauti project. Particulars regarding the former have been fully recorded in Chief Engineer's note on Mr. Macconchy's report, paragraph 114, *et seq.* As regards the Durgauti, its drainage area up to the point where the river debouches into the plains, *i.e.*, about the probable site of dam, is about 310 square miles. A rainfall of 12" over a square mile is equivalent to about 28 million cubic feet. In years of extreme drought, from the rainfall returns of Sasaram, a total fall of 22.5 inches may be anticipated during the *kharif* season, of which probably two-thirds or 15" may be stored, giving a total storage of $(310 \times 28 \times \frac{2}{3}) = 10,850$ million cubic feet. The following are the areas commanded and irrigable as estimated in Mr. Macconchy's report, page 124:—

	Area commanded. Sq. miles.	Area of <i>kharif</i> irrigable. Acres.	Length of main distributaries. Miles.
<i>Smaller scheme.</i>			
Between Sone and Durgauti rivers, south of larger scheme	50	10,000	20
Between Durgauti and Kudra rivers	50	10,000	12
Total	100	20,000	32

The storage amounting to 10,850 million cubic feet, and the area to be irrigated 20,000 acres, the allowance works out to a million cubic feet for every 2 acres which is very ample. Mr. Macconchy considers it safe to count on a duty of 20 acres per million cubic feet, even after allowing for deterioration of reservoir, loss from leakage, etc. The cost of the scheme, as estimated by Mr. Macconchy (page 125 of his report), is as follows:—

<i>Durgauti scheme.</i>		Rs.
Storage reservoir for 20 acres at Rs. 30 per acre		6,00,000
Weir across Durgauti, 1,000 feet, at Rs. 200 per foot		2,00,000
High-level canal from weir to Sasaram, 16 miles, at Rs. 16,625 per mile		2,50,000
Distributaries, 20,000 acres, at Rs. 12-8 per acre		2,50,000
Total works		13,00,000
Establishment, Tools and Plant and Indirect Charges at 30 per cent.		3,90,000
Total Capital cost		16,90,000

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The cost of the storage reservoir may be accepted. The weir, I do not think, is likely to be more than 500 feet across. The area to be irrigated is about the same on each side of the Durgandi river. The high-level canal would probably extend 8 miles on each side of the river and the total length of 16 miles is probably correct. As, however, only 10,000 acres is to be irrigated on each side, allowing a duty of 50 acres to the cubic feet, the canal would only be required to carry 200, or, say, 250 cusecs. The rate per mile, viz., Rs. 15.625, appears to me on too liberal a scale, and it will be amply sufficient to allow Rs. 6,250 per mile, the average cost of the Bohia and Dumoron branch canals carrying 425 and 550 cubic feet having been Rs. 7,000. For the remaining 16 miles of branch canals Rs. 400 per mile should suffice. The estimate revised would then be—

	Rs.	Rs.
Storage reservoir . . .	6,00,000	...
Weir, 500 feet, at Rs. 200 .	1,00,000	...
Main high-level canal, 16 miles, at Rs. 6,250 .	1,00,000	8,00,000
Branch canals, 16 miles, at Rs. 4,000 . . .	64,000	...
Minor distributaries, 20,000 acres, at Rs. 4 . . .	80,000	1,44,000
Total . . .	9,44,000	9,44,000
Preliminary expenses . . .	...	25,000
Total works . . .	...	9,69,000
Add—30 per cent. Establishment and Tools and Plant and Indirect Charges, say . . .	...	2,91,000
Total Capital cost . . .	...	12,60,000

Maintenance charges including revenue management based on the working of Sone Canals = $3\frac{1}{2}$ per cent. on capital cost of works, inclusive of establishment.

Maintenance.	Rs.	Rs.
Three and one-third per cent. on cost of works, viz.	9,69,000	=32,300
Revenue.		
20,000 acres, <i>kharij</i> , at Rs. 2 = . . .	40,000	
8,000 acres, <i>rabi</i> , at Rs. 1-8 = . . .	12,000	
Total . . .	52,000	

The net revenue in this case is Rs. 52,000—Rs. 32,300 = Rs. 19,700, which is equivalent to 1.56 per cent. on the total capital cost. These rates are low, and there is no reason why the rates obtained on the Sone Canals should not be realised in which case the revenue would be—

	Rs.
20,000 acres, <i>kharij</i> , at Rs. 2-8 = . . .	50,000
8,000 acres, <i>rabi</i> , at Rs. 2 = . . .	16,000
Total . . .	66,000

The net revenue would then be Rs. 66,000—Rs. 32,300 = Rs. 33,700, equivalent to 2.67 per cent. on the total capital cost. This project is, in my opinion, deserving of detail investigation, as likely to be a good protective work, falling within the scope of the projects indicated in paragraph 3 of Government of India Resolution No. 13—61-16 (Famine), dated 13th September 1901. Its investigation and construction (if found practicable) should follow that of the larger project of the Karmnassa.

4. Provincial works.—There are none in this Circle.

5. Private irrigation works other than wells.

(a) Brief description of such works (including field embankments) by whom constructed and controlled, state

of repairs, their liability to failure in a year of drought, obstacles, if any, to their extension.—Under this class in Bhabua and Sasaram Sub-divisions only the *ahars* can be reckoned. These consist of low retaining embankments constructed across the drainage lines of the country from shallow trenches dug above them forming shallow storage reservoirs from which water is let out by cuts or lifted on to the fields below. The fields themselves are also bounded on all four sides by small earthen ridges, *kiaris*, 9 inches to 1 foot in height, which serve to regulate the flow and also to retain the required depth of water. They are generally of small area. The *ahars* are the property of the zamindars by whom they were constructed. They are either repaired by the zamindars or the villagers: in the former case the zamindars reimburse themselves by the higher rent they are able to obtain from the lands which are watered from the *ahars*. An *ahar*, it is estimated, can irrigate from 3 to 6 times its area. They vary much in size. In years of drought these *ahars* are more or less liable to fail and generally do so if the rains cease early in September, in which case the rice crop under them does not receive a watering in the *hathia* (1st half of October) and does not mature: *ahars* exist in nearly all villages, the zamindars and villagers being fully alive to their interests for the construction of these *ahars*.

(b) Extent to which construction has been assisted by advances from Government concessions, if any, given to the constructors of such works.—In some few instances advances may have been given by Government under the Land Improvement Act, but not generally. I am not aware of any concessions being granted. On these points the Civil Department is better able to give information.

(c) Obstacles to their extension and possibility of stimulating their construction in tracts liable to famine.—Their extension is not necessary in the tracts under consideration; they exist where necessary. The conflicting and vested interests of cultivators and zamindars would probably be an obstacle to any extension of the system.

(d) Can new works of this kind be constructed without the permission of Government or without reference to their possible effect in intercepting the supply to either Government or private works?—I am not aware of any law by which the permission of Government is required in the case of the construction of a new *ahar*, and so far as I am aware, it may be constructed without reference to the possible effect it may have in intercepting the supply to other *ahars*; but this is a matter on which the Civil Department is also better able to give information as to *ahar* rights.

6 Wells.

(a) Districts or tracts in which well cultivation is most largely practised.—Throughout South Bihar wells are used for cultivation of *rabi*, poppy, vegetables and sugarcane, as these crops only require light irrigation. Rice requires too much water to be irrigated from wells. In the tract in the Patna District lying between the East Indian Railway and the River Ganges between Bankipore and Dinapore which is subjected to inundation from the Ganges floods, and thereby rendered fruitful, I believe well cultivation is more largely practised than elsewhere. Well cultivation is also resorted to in South Bihar in all tracts outside the canal areas.

(b) Average depth of water below ground surface in each district or tract.—In Patna and Gya Districts about 20 to 30 feet. In Shahabad from 15 to 20 feet.

(c) Cost of wells used for irrigation.—Wells are of two classes:—(1) Ordinary earthen wells (*kuan*) either without any protection (*kuteha*) or having bamboo or earthenware rings from which irrigation is effected with a single lever and bucket (*latk*). The great majority of wells are of this class. They are about 3 feet in diameter and cost from Rs. 4 to Rs. 15. (2) Masonry wells (*tnara*) vary from 3 to 10 feet in diameter from which irrigation is effected with a leathern bucket (*moth*) and bullocks or several levers and buckets. These wells are usually situated in or near village sites and are used by the village community for irrigation of adjoining lands. Cost of the smaller sizes, 3 to 4 feet diameter, vary from Rs. 60 to Rs. 100; 6 feet diameter, Rs. 150 to Rs. 200, and still larger ones from 300 up to 1,000, according to diameter and depth.

(d) Average area irrigated per well.—This varies not only with the kind of crop grown, nature of soil and depth of water below the surface, but also depends on the personal industry of the cultivator and the area of land possessed by him.

The following table is from observations made by Colonel Heywood, R.E., and shows the quantity of water required for one acre of the principal crops irrigated :—

Name of crop.	Number of irrigations.	Water employed for irrigation.	Total quantity of water required.
		C. ft.	C. ft.
Wheat	3	6,800	20,400
Barley	3	6,800	20,400
Peas	2 to 3	6,800	20,400
Grain	1	6,800	6,800
Opium	7 to 8	6,800	47,600 to 54,400

From the small wells (*kuan*) $\frac{1}{2}$ to 2 acres may be irrigated by one bucket and lever. From the smaller masonry wells with a couple of levers and buckets, or with one *muth* from 3 to 5 acres, and from the larger wells working two *muth* as much as 10 or even 15 acres might be irrigated. The average area irrigated from wells is probably about half the above figures.

(e) *Extent to which the supply of water is affected by drought.*—The level of water remains fairly constant in ordinary years of drought except in the hot-weather months of April, May and June. At this period there is little or no cultivation except that of sugarcane.

(f) *Concessions, if any, given to the constructors of new wells.*—On this I have no reliable information; the Civil Department may be consulted. Probably in the years of drought advances have been made.

(g) *Is it possible or desirable to stimulate the construction of new wells by more liberal advances or concessions?*—As a general principle, I think it is better that the construction of the masonry wells should be left to, and devolve on, the zamindars or landlords who might be encouraged by advances, recoverable in a certain term of years. For the construction of the common *kuchcha* wells the cultivators can generally arrange, small sums, say, Rs. 1 or Rs. 2 might be presented them in a year of extreme drought for the purpose of constructing them to save their crops; they seldom last more than a year. This is only desirable in tracts outside the canal irrigated area.

Paragraph 7.—Black cotton soil.

(a) *Where prevalent; usual depth; nature of the underlying stratum.*—Black cotton soil, such as exists in the Bombay Presidency and Central Provinces, is not found in South Bihar, though there is a soil in the Chauva Pargana of Shahabad said to approach it. The clayey soils, which are more general and somewhat analogous to black cotton soil, are what are locally known as *kerail* and *kerail*. In the Gya District it extends along both banks of the Punpun river in a varying width of from 5 to 10 miles, and this extends for a short length into the Patna District. In Shahabad it prevails in the west of Saesaram Sub-division and in the Bhabun Sub-division north of the Grand Trunk Road. It varies much in depth of a thickness not less than 10 or 15 feet. The sub-soil is generally a yellow clay or loam.

(b) *Is there any desire for irrigation on the part of the cultivators of such soil?*—The desire for artificial irrigation is, I think, shown by the existence of *ahars* wherever their construction has been possible and likely to be beneficial.

Kawal lands are said to be best suited for rice and sugarcane, *kerail* lands for *rabi*, but in the canal irrigated areas, in many places, *kerail* lands have been brought under rice cultivation when there is an assured supply of water and an assurance of a profit equal to that of *rabi*. These lands formerly were reserved for *rabi*, as they retain moisture very well and produce the cold-weather crops with little or no irrigation.

(c) *Extent to which the suitability of these soils for irrigation is affected by their depth and by the facilities for natural drainage affected by the stratum underlying them.*—These soils being retentive of moisture require but little irrigation, especially when their thickness is so much as in these South Bihar Districts, and there is but little, if any, natural drainage into the sub-soil. Where the thickness of such soils is only from 18" to 2 feet in depth with an underlying stratum of sand, as I noticed in North Champain, frequent and heavy irrigation is necessary, otherwise the rice crops dry owing to the rapid natural drainage through the sandy sub-soil.

Paragraph 8.—Water-rates and distribution of water on Government work.

(a) *Scale of water-rates on major and minor works.*—The rates per acre current on the Sonos Canals in 1902 are—

	Rs. A.
Seven years' lease for block areas, all crops between 25th June of one year and 25th March of the next	2 8
Kharif season leases between 25th June and 25th October	3 8
Rabi season leases between 15th October and 25th March following	2 0
Hot-weather season leases between 25th March and 25th June	4 8
Hot-weather season leases between 25th March and 25th June for each watering	2 0

When water is available it is also sold by volume.

Between 1st September and 31st October per calculated discharge of one cubic foot per second for 12 hours	4 0
Between 1st November and 25th March following for filling <i>ahars</i> per one cubic foot per second for 12 hours	1 0

(b) *How is the distribution of water arranged for and controlled?*—From the canals and distributaries the water is let out through permanent and temporary outlets into village channels constructed by the people. The opening and closing of the outlets is controlled by and in the hands of the canal staff. The outlets are worked on the *tatil* or rotation system, being kept ten days open and five days closed. The size of outlets are now being based on a duty of from 50 to 60 acres per cubic feet per second according to the nature of the soil. From the village channel the cultivators arrange amongst themselves as regards the distribution of the water.

(c) *Effect of years of favourable rainfall, the demand for irrigation and on irrigation revenue.*—This is clearly exhibited in the following table, which gives the acres irrigated, rainfall and revenue for the past ten years. It is to be recollected that the *rabi* revenue is included in the following year to that in which the irrigation occurs :—

Year.	Kharif.	Rabi.	Hot weather.	Total.	Rainfall.	Assessment or revenue demand.	REMARKS.
	Acres.	Acres.	Acres.	Acres.	Inches.	Rs.	
1892-93	274,839	126,195	9,727	410,761	37.69	9,50,733	Below average, light in <i>kathia</i> .
1893-94	280,628	66,458	10,700	366,776	48.62	6,53,161	} Good <i>kathia</i> . Deficient in <i>kathia</i> . Rains ceased early in September.
1894-95	258,301	41,604	17,109	317,134	50.65	6,86,005	
1895-96	261,485	116,843	18,304	396,222	38.36	6,50,240	
1896-97	316,341	215,300	22,825	556,166	30.59	9,50,865	
1897-98	299,061	103,871	31,013	433,445	53.59	11,33,032	Favourable.
1898-99	304,778	110,035	25,983	440,796	55.74	9,23,068	Favourable, but none in <i>kathia</i> .
1899-1900	305,464	123,208	25,331	454,003	55.34	9,71,922	Deficient in transplanting season; no <i>kathia</i> rain.
1900-1901	323,438	90,084	17,001	432,413	39.65	10,39,594	Heavy rain in <i>kathia</i> .
1901-1902	381,909	195,413	30,172	557,491	27.60	10,59,225	No <i>kathia</i> rain.

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APPENDIX D.

Statement showing the time of sowing and arriving at maturity of the principal crops grown in the tract of country traversed by the Sone Canal.

Description of crop.	English name.	Native name.	Scientific name.	When sown.		When cut.		First watering required.	Irrigation most necessary.	Number of waterings usually taken to bring the crop to maturity.	Remarks.
				From	To	From	To				
Cereals	Wheat	Gehun	Triticum vulgare (Willd.)	15th October	20th November	CROPS.		Early in November	Mid-December	3	Water usually required a fortnight after sowing.
		China	Panicum minimum (Linn.)	20th December	1st May	10th February	18th June	Late in December	Every fortnight	5	Three crops usually taken off. Water required a week after sowing.
	Burley	Jau	Hordium maritimum (Linn.)	15th October	20th December	20th "	15th April	Early in November	Mid-December	3	Water usually required a fortnight after sowing.
	Oats	Jal	Avena sativa (Linn.)	15th "	20th "	20th "	23th "	Early in December	Mid-January	3	
	Inferior rice	Boro dhan	Oryza sativa (Linn.)	15th November	18th January	1st April	31st May	Always standing in water	.....	.....
Sugarcane	Sugarcane	Ubb	Saccharum officinarum (Linn.)	1st February	31st March	20th November	30th April	Mid-February	Mid-April	0 (1 before the first, 2 after)	Water required two days after sowing.
Palms	Gram	Bent	Cicer arietinum (Willd.)	15th October	18th December	15th February	15th "	Usually sown as a grain or second crop in the rice fields before the water has been drained off; afterwards no water is usually taken, though in sandy soil, the sowing may require one or two subsequent waterings.	.....	.....
Pulses	Pas	Kheari	Lathyrus sativus (Willd.)	15th "	20th "	25th January	15th "	Mid-November	Mid-December	3	
		Mohar	Trigonum arvense (Linn.)	10th June	1st August	20th "	18th April	Not usually irrigated.			
Dyes		Babar	Caesalpinia indica (Swartz.)	10th October	18th December	10th February	20th March				
		Mansur	Erythraea tinctoria (Willd.)	16th August	1st November	10th July	15th August	Ditto	.....	.....	Distinguished as Karika.
	Indigo	NI	Indigofera tinctoria (Willd.)	1st February	1st April	12th "	15th "	Mid-February	End of March.	4	Distinguished as Phagura or Juma. Water usually wanted a week after sowing.
	Safflower	Kamun	Carthamus tinctorius (Willd.)	16th October	16th November	16th February	16th April	Mid-November	Mid-December	3	Always sown with other crops as wheat, poppy, etc.
	Turnerite	Hald	Cuscuta longa (Linn.)	1st May	16th July	28th December	26th March	Mid-May	May	3	

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APPENDIX D.

Statement showing the time of sowing and arriving at maturity of the principal crops grown in the tract of country traversed by the Sone Canals.

Description of crop.	English name.	Native name.	Scientific name.	When sown.		When cut.		First watering required.	Irrigation most necessary.	Number of irrigations usually necessary to bring the crop to maturity.	Remarks.
				From	To	From	To				
Oilseed .	Linseed .	Til .	LINUM CATAPATHICUM (Willd.)	16th October .	15th November .	18th December .	1st April .	Not usually irrigated, and as a rule sown in rice-fields as a crop of second crop.	.....	.....
	Mustard .	Bal .	SINAPIS NAROSA (Z.)	12th " .	20th " .	22th " .	1st March .	Mid-November .	.....	2	
	Castor .	Heri .	RICINUS COMMUNIS (Linn.)	20th June .	1st August .	29th " .	30th April .	Not usually irrigated	.....	.....
	Poopy .	Pa-la .	PAPAYA SONCHIFERUM (Willd.)	18th October .	20th November .	1st February .	31st March .	Mid October .	Mid-February .	9 or more	Water usually wanted three days after sowing.
	Cotton .	Kapra .	Gossypium hirsutum (Willd.)	10th June .	12th July .	13th March .	16th April .	.....	.....	.....	Seldom grown in the area commanded by the Sone Canals.
Cereals .	Early rice .	Bhadol dhan .	Oryza sativa (Linn.)	15th June .	31st August .	10th September .	30th November .	Mid-July .	July .	3	As a rule, however, this crop is left to be matured by rainfall. It is not transplanted.
		Bajra .	Pennisetum purpureum .	1st July .	18th " .	16th " .	18th October .	.....	.....	.....	Seldom grown within the area commanded by the Sone Canals.
	Jowar .	Jowar .	Sorghum vulgare .	18th June .	20th " .	6th November .	15th December .	.....	.....	.....
	Maize .	Makal .	Zea mays (Linn.)	29th " .	20th July .	18th July .	16th October .	Not usually irrigated.			
		Matura .	Echinochloa crusgalli (Gaert.)	1st " .	20th " .	15th August .	18th " .	.....		
Fibre .	Jute .	Palin .	Cochlosoma capillaris (Willd.)	10th February .	31st March .	30th " .	26th December .	See above, as this crop is usually sown among it.			
	Hemp .	San .	Crotalaria retusa (Willd.)	16th June .	14th July .	20th September .	31st January .	.....	.....	.....	Seldom grown in the area commanded by the Sone Canals.
Cereals .	Late rice .	Kharif dhan .	Oryza sativa (Linn.)	10th June .	31st August .	1st November .	1st January .	Mid-June .	Early October .	7 or more	Includes both transplanted and non-transplanted rice.
		Kodo .	Pennisetum setaceum (Linn.)	20th May .	31st July .	16th September .	15th December .				
Palms .	.....	Urid .	Phasolus monspeliensis .	20th " .	31st " .	30th " .	30th November .				
		Mam .	Phasolus mungo (Willd.)	20th " .	31st " .	20th November .	14th December .	Not usually irrigated.			
		Methi .	Trigonella foenum-graecum (Willd.)	20th " .	31st " .	16th October .	18th " .				
		Kurhi .	Dactyloctenium aegyptium (Willd.)	30th August .	15th September .	25th November .	20th " .				
Tobacco .	Tobacco .	Tamaka .	Nicotiana glauca (Linn.)	12th October .	13th November .	16th January .	16th February .	.....	.....	.....	Seldom grown in the area commanded by the Sone Canals.

C. H. DEMELLO,
Executive Engineer, Arrah Division.

APPENDIX E.

RICE.

Result of crop experiments from 1897-98 to 1901-1902.

	Number of experiments.	AVERAGE YIELD PER ACRE (WEIGHED DRY)		
		Grain.	Straw.	
1	2	3	4	
TABLE I.—Good "rice" crops irrigated with canal water.				
Sone Circle average	1897-98	24	Mds. s.	Mds. s.
	1898-99	20	28 19	53 2
	1899-1900	33	30 4	46 35
	1900-1901	23	32 32	68 13
	1901-1902	79	28 19	55 31
		28 20	48 0	
TABLE II.—Average "rice" crops irrigated with canal water.				
Sone Circle average	1897-98	86	22 57	47 23
	1898-99	101	22 3	33 38
	1899-1900	93	22 30	38 3
	1900-1901	98	19 28	34 9
	1901-1902	83	20 36	36 0
TABLE III.—Good "rice" crops irrigated without canal water.				
Sone Circle average	1897-98	25	27 12	55 1
	1898-99	17	24 38	42 31
	1899-1900	20	26 21	48 38
	1900-1901	17	22 11	44 28
	1901-1902	24	22 8	39 0
TABLE IV.—Average "rice" crops irrigated without canal water.				
Sone Circle average	1897-98	63	20 3	36 2
	1898-99	83	17 21	29 25
	1899-1900	66	16 29	30 13
	1900-1901	72	14 18	25 35
	1901-1902	89	12 30	24 0

APPENDIX F.

RABI (WHEAT).

Result of crop experiments from 1897-98 to 1901-1902.

	Number of experi- ments.	AVERAGE YIELD PER ACRE.		
		Grain.	Straw.	
1	2	3	4	
TABLE I.—Good "rabi" crops irrigated with canal water.				
Sone Circle average	1897-98	15	Mds. s.	Mds. s.
	1898-99	10	15 38	19 15
	1899-1900	4	19 25	27 14
	1900-1901	4	13 34	20 26
	1901-1902	10	11 1	19 9
			24 37	29 30
TABLE II.—Average "rabi" crops irrigated with canal water.				
Sone Circle average	1897-98	57	11 23	13 29
	1898-99	52	14 11	7 4
	1899-1900	56	9 32	12 32
	1900-1901	45	7 7	11 12
	1901-1902	51	13 20	16 35
TABLE IA.—Good "rabi" crops irrigated without canal water.				
Sone Circle average	1897-98	12	17 9	24 10
	1898-99	16	17 21	19 23
	1899-1900	8	16 33	21 17
	1900-1901	5	11 35	16 30
	1901-1902	10	22 27	25 0
TABLE IIA.—Average "rabi" crops irrigated without canal water.				
Sone Circle average	1897-98	39	10 38	11 1
	1898-1899	29	12 20	16 13
	1899-1900	43	9 28	13 2
	1900-1901	42	7 30	13 0
	1901-1902	34	11 16	16 30

Mr. J. H. Toogood.

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No. 4114, dated the 17th October 1902.

From—The Superintending Engineer, Sone Circle,

To—The Chief Engineer, Bengal, Public Works Department.

With reference to your No. 380-T.I. of the 18th ultimo, forwarding a copy of the replies, dated 17th February 1902, by C. E. A. W. Oldham, Esq., Collector of Gya, to the questions set by the Irrigation Commission and asking for the opinion of the Executive Engineer, Eastern Sone Division, and myself on his replies regarding *pains* and *ahars*, especially paragraph 20 thereof, I have the honour to submit copy of the Executive Engineer's opinion as set forth in his letter No. 4621 of the 3rd instant.

2. The paragraphs which deal with *pains* and *ahars* are paragraphs 12 *et seq.* In paragraphs 12 and 13 the system of *pains* and *ahars* irrigation in the Gya District has been very fully and accurately described by Mr. Oldham, and I have nothing to add. The system of *pains* and *ahars* irrigation is, owing to the physical features of the district, peculiar and essential to it, and enables the cultivation of rice, the staple food of the people, by supplementing the rainfall, which is inadequate for the purpose: their existence is, therefore, of great famine protective value. They are managed, as stated, by the people among themselves without control from Government and are maintained by the landlords, ordinary repairs being carried out by the cultivators themselves.

3. In regard to these works, Mr. Oldham states that the two most important directions in which legislative action is at present necessary are—

(a) the provision of a masonry head-work to control the level at the entrance and regulate the inflow;

(b) the enforcement of the upkeep of existing *pains* in *bhaoli* tracts.

It is specially in respect of these proposals that my opinion, I believe, is asked. As regards (a), I am quite in accord with Mr. Oldham. A regulator at the head should be insisted upon, otherwise the main channel and course of the river is liable to be diverted down the *pain*, which gradually deepens and enlarges; this is more especially the case when the *pain* is cut in the angular bend of the river in the direction of the current. There are several examples of the effect of this; the principal one that comes to my mind is that of the "Panchana" river, south of the town of Bihar, in which some 100 years or so ago two *pains* of 10 feet width were taken off; these are now 100 feet and 300 feet in breadth, and the main stream of the river passes into them, the result being that below them in the bend and beyond the river bed has tilted up and the river only finds its way into the old channel in the higher floods. The people along the old bed have thus been deprived of their supply and now have no redress. Other instances, which have been brought to my notice, and on which I have been consulted, are on the "Mohar" river near Tikari on the "Phalgu" and "Sakri" rivers. I am also of opinion that the erection of *bunds* in the river beds should be prohibited, as undoubtedly they deprive villages lower down to a supply to which they are legitimately entitled. In fact, legislation should extend to prohibiting any interference with the main rivers and streams of districts without the sanction of Government. As regards (b), once the *pain* is made, and a proper regulator constructed under sanction of Government, their upkeep and the distribution of water should, I consider, be left as now to the people to manage amongst themselves: too much grandmotherly legislation is not desirable or good for any people. I do not think it would be possible for

Mr. J. H.
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Government—to control irrigation from these works scattered all over the district. Generally speaking, the landlords and cultivators well know the value of water for agricultural purposes, and I do not think are blind to carrying out what is to their advantage and interests in regard to the upkeep of these *pains* and *ahars*. In the case of *bhaoli* tenures, if the crop dies, landlords and tenants suffer alike, and if the landlords are indifferent and extortionate in the long run, they will suffer by their tenants leaving their holdings. As a rule, I believe landlords find it to their interest to help their tenants and retain them in their villages.

4. In cases where it is considered necessary, I am of opinion that it is desirable that landlords and cultivators should be encouraged to maintain and construct these *pains* and *ahars* by advances on liberal terms. New works should, of course, be professionally approved, and sanction then accorded by the district officer, who would decide on the amount of assistance that should be rendered and the terms on which it would be given.

No. 4621, dated the 3rd October 1902.

From—The Executive Engineer, Eastern Sone Division,

To—The Superintending Engineer, Sone Circle.

With reference to your demi-official letter, dated 26th September 1902, forwarding Bengal Government No. 380-T.I., dated 18th idem, with enclosures (herewith returned), for an expression of my opinion, I have the honour to report as follows:—

Mr. Oldham's replies to questions 1 to 11.—Agree very closely with the opinion forwarded by me to the Collector of Gya with my No. 74-R., dated 20th January 1902.

With reference to paragraphs 12 to 19.—Mr. Oldham has a much more intimate knowledge of the working of *pains* than I possess, as my duties do not take me much into the areas irrigated under this system. I quite agree with Mr. Oldham in the concluding paragraph of his reply to question 12, in which he points out the necessity for some provision being made under which Government could force the landlords to maintain the *pains* in good order, and in the event of their failing to do so Government should have the power to do the work for them and recover the cost from the landlords.

It is, in my opinion, impossible to canalise any of the rivers in the Gya District efficiently, as the supply depends entirely on local rainfall and no water can be obtained in years of scanty rainfall.

This is so.

J. H. T.

Paragraph 19.—The damage referred to by Mr. Oldham is caused almost entirely by the want of proper head-works to *pains*. If the supply could be regulated so as to keep out water during high floods, the quantity of sand brought into the *pains* would be comparatively harmless. As, however, none of the rivers in the Gya District, with the exception of the Punpun, have any direct outfall into the Ganges, all the sand brought down by these rivers must eventually find its way on to the fields and all the sand kept out of *pains* in the upper reaches must be deposited somewhere lower down.

1. Q. (The President).—How long have you been Superintending Engineer of the Sone Circle?—Five years.

2. Q. And, as I know, you have had long experience here before.—Yes, as Assistant Engineer and Executive Engineer.

3. Q. We have had ample evidence that the irrigation here is extremely popular, as popular as I have seen anywhere.

4. Q. I understand that the whole supply that you can count upon in the *kathia* is employed.—Certainly.

5. Q. In every year?—Not every year. In 1899 the supply of water fell below, and if we had had to supply water to a larger area, we should not have been able to do so.

6. Q. The *kathia* is a period of about 15 days?—Yes, generally from the 26th of September to the 10th of October.

7. Q. Could you in a year, when the supply failed, say to the *raiya*s—"We cannot give it to you in 15 days, but we can give it to you in 22 days"?—That was what practically happened in 1899.

8. Q. Were they much worse off?—I don't think they were.

Paragraph 20.—I quite agree with Mr. Oldham in his remarks on the evils of the *bhaoli* system, but I am decidedly of opinion that it would not benefit the tenants for Government to take over the entire control and management of the *pains*. These channels are so numerous and the country so difficult to get about in that their management would necessitate a very large number of subordinate officials with the attendant evils. A very large increase in supervising officers would also be required to keep a check on the subordinates. On the whole, the tax on the tenant would really be heavier than it is now.

Quite so.

J. H. T.

Under the present system the interests of landlord and tenant are really identical, and if the landlord could be brought to see this, the division of the crop being brought under control, the present system would, I think, be the most suitable for the district.

I quite agree with Mr. Oldham in considering that it is very necessary that proper head-works should be constructed for all *pains* and that the maintenance of *pains* in proper order should be enforced. The question of the prevention of *bunds* across the rivers is a more difficult one. The supply of water in all the rivers in years of scanty rainfall is not sufficient for all, and the need of water is so great that it would require an armed force to prevent the cultivators making a *bund* across a river when they saw their own crops dying and water going past which could save them.

In October 1899-1900 when the supply in the Sone failed it was found necessary to employ a comparatively large police force to prevent the banks of the Patna Canal and its distributaries being cut. The difficulty would be very much increased in the case of *pains* which are scattered all over the district and are in many cases difficult of access.

I have already stated that I do not consider that canalisation of any of the Gya rivers is desirable; the Punpun is in some respects an exception. It is a perennial stream with well defined banks and carries a fair discharge even in year of drought. At present *bunds* are made at various points in its course both in Gya and Patna Districts, and when the rains fail a large area is irrigated from it. It would be possible and perhaps desirable to regulate these *bunds* and in some places feed canals. Masonry weirs and permanent head-works would be required, as the cost of temporary *bunds* is high and they cannot be made until the river falls very low.

The river is very wide and shallow, and I do not think the scheme suggested could be carried out and worked except at a prohibitive cost.

J. H. T.

Paragraphs 21 and 22.—I agree in general with Mr. Oldham's remarks.

D.—TANKS.

Paragraph 23.—The construction and maintenance of *ahars* is, in my opinion, best left as it is. The landlords and cultivators understand the principles under which they can be worked satisfactorily. By these means a large quantity of water is stored for future use, and given good rain in August and at the end of September, the crop dependent on them is assured. The lands on which *ahars* are used could not easily be irrigated in any other way.

Paragraphs 24 to 33.—I agree with Mr. Oldham's opinion.

9. Q. Did they cry out for remissions? Did you grant them remissions?—No. We gave remissions where the crop fell below a certain average.

10. Q. During the whole season there are periods when there is more water than is actually wanted, even the *kathia*?—There are periods in which we have more water than is required.

11. Q. Would it be worth while to take measures for increasing the supply of the canals for that time?—I am afraid the expense would be prohibitive.

12. Q. I should like to know whether you could cut down the walls of your weirs so as to create greater velocity?—It would cost a certain amount of money, but it might be worth it. It might damage navigation, but that would be immaterial.

13. Q. Is it a thing that has come before you?—I have thought of it.

14. Q. I understand that the extreme pressure at the time of the *kathia* is due to the draining off of the whole rice-fields just before?—Yes.

15. Q. Could you to any advantage arrange to fill *ahars* just before, say, in the first week of September?—We could fill the *ahars*, but it would affect the irrigation. I fancy if we went in for that system the leases would decrease. I don't see how you could quite make an assessment.
16. Q. (Mr. Muir-Mackenzie).—Is there not enough water to supply the leases and to fill the *ahars* as well?—There would be at times.
17. Q. (The President).—Could one use the *ahars* as supplementary storage basins?—Of course where the whole block or all the lands below the *ahars* were under leases there would be no harm in filling the *ahars* when we are spilling water.
18. In September you are spilling water?—Generally we are.
19. Q. You think the difficulty would be about assessment?—Yes. Some of these *ahars* are connected one with another, and they would probably pass on the water to unleased lands.
20. Q. Is there inside the field of irrigation a considerable amount of water supplied to lands which do not pay any canal rates?—There is. We try to prevent the *ahars* being filled from the canals except at certain times when water is given at fixed rates, but there is always a lot of malpractices in the way of water being taken into unleased lands.
21. Q. If these malpractices mean wastage of water, they are malpractices. If they mean merely a question of difficulty of assessment, would not you wish to get rid of that difficulty somehow? For instance, could not the difficulty be got over so as to store and utilize water, the *ahars* being used as reservoirs?—If all the lands were leased, of course there would be no objection whatever; but of course there are certain high lands, which could not be irrigated under the *ahars*.
22. Q. (Mr. Rajaratna Mudaliar).—Might the *ahars* be filled by arranging for lump payments from the zamindars?—You would have to select your *ahars* for that purpose. You might do it that way. It is possible.
23. Q. (The President).—You say the sugarcane cultivation has been doubled since the construction of the Sone Canals: Its area is limited to the hot weather supply?—Yes.
24. Q. You mean the supply before the rains?—Just before the rains. The hot weather season ends with the 25th of June.
25. Q. What are you irrigating besides sugarcane then?—Sugarcane is the principal crop; there is a little indigo also.
26. Q. Do you practically take every drop of water you can for sugarcane?—We are often very hard pressed indeed for the sugarcane. In fact, the eastern main system has often to be closed owing to dearth of water in the hot weather, i.e., from the 20th of April; the water we let out is even sold.
27. Q. We found elsewhere a very considerable system of supplementing canal irrigation and tank irrigation by wells?—You see here the staple food of the district is rice and that cannot be irrigated by wells.
28. Q. I mean for crops like sugarcane?—They do irrigate a little sugarcane in places from wells; in the Bhabua Sub-division I have seen a large plot of sugarcane irrigated from a well.
29. Q. They would not think of helping canal irrigation by irrigation wells?—I don't think so.
30. Q. What is your hot weather supply?—It goes down to about 600 or 700 cusecs.
31. Q. There has been no question of storage in the valley of the Sone, has there?—No; I don't think there is any project, unless you take those smaller irrigation streams in Chota Nagpur. They are on the tributaries of the Sone.
32. Q. I suppose you have not much occasion to go into Bhabua?—I have to visit Bhabua; I mean just going by railway to Bhabua, but I have not travelled about much within the Bhabua Sub-division.
33. Q. You were here before the irrigation by the Sone Canals began. Is Bhabua very much in the same state as this part was before it came under irrigation?—I think Bhabua is very much worse than the Shahabad tracts were without canals.
34. Q. (Mr. Muir-Mackenzie).—What did these depend on then?—*Ahars* principally.
35. Q. Shahabad is very much like Gya?—Totally different. It is a flatter country. Gya is an undulating country. It (Gya) is like parts of Madras.
36. Q. (The President).—In the report of the Karamnassa scheme I find in Mr. Maccomby's report that he says:—“The question of command is the next one to be considered, and here we are met by the difficulty that the Karamnassa traverses the western and northern portions of the district concerned, so that the bulk of the storage is unsuitably placed for conveyance to the affected tracts.” He also goes on to say:—“The only solution to the difficulty appears to be to construct a high-level canal, taking off from a weir, to be constructed as close as practicable to the point where the Karamnassa emerges from the hills (say, at about the level of the 270' or 280' contour) and running nearly due east for about 36 miles, falling gradually to about the 250' contour at the point where it would meet the Kudra river.” Could you not take a canal from the bottom of it?—Those reservoirs are too high up the river for a canal to be taken direct from them. The reservoirs are very high, and there is a water-fall of 175 feet below their proposed sites.
37. Q. Then the river itself would be made to carry water?—The reservoirs would hold the water and the river would be used to carry it to a weir lower down.
38. Q. I suppose you think it would be the right thing to throw out this Karamnassa project and have it properly surveyed?—Most decidedly.
39. Q. Have you means in the way of officers for undertaking it?—I have not. It certainly requires a special man and a good man.
40. Q. Has the Province got the means?—Mr. Horn would be able to state that.
41. Mr. Horn—I think we could get it done.
42. Q. (The President).—You heard Mr. Rajaratna's examination just now. Can you give us information as to what the cost per acre is for the measurements?—It has all been most carefully worked out in this book. It comes to about 5½ annas per acre. I think the Deputy Collector's establishment costs between Rs. 60,000 and Rs. 70,000 a year. The cost of measurement and collection are nearly equal—between 7 and 8 per cent each. At present the cost of measurement and collection are nearly half-and-half.
43. Q. That is, 15 per cent, both for measurement and collection?—About that.
44. Q. Are you satisfied with the way that the contract system works?—I am quite satisfied: it is very good.
45. Q. It does not lead to any waste of water: want of economy of water?—It is minimized.
46. Q. Do you look after the village channels?—Yes, they are under us. They are paid for by the villagers and zamindars, but they are under our supervision, and we can enforce their repairs under section 60 of the Canals Act.
47. Q. Are you satisfied that the period of seven years is a suitable one for leases?—I think it is about the limit it should be.
48. Q. You think it should not be longer?—I certainly don't think it should be longer. People die, and you find many changes in seven years.
49. Q. Have you any suggestions which you would like to bring before the Commission as regards the points before it?—I don't think so. I don't think there is anything.
50. Q. Have you found here any demand for drainage accompanying irrigation?—That was some years ago, just after the irrigation commenced on the Sone Canals and a large number of drainages were carried out.
51. Q. You have a number of drainage channels?—Yes.
52. Q. (Sir Thomas Higham).—As regards these questions of measurement, I understand you have very little measurement to do in the Sone Canals?—A great deal of measurement has to be done. Blocks have to be measured when you give a lease.
53. Q. After you have given the lease you don't measure at the end of the cropping to see which parts of the field have taken water and which have not?—No. We assume all has been watered. A man is liable whether he takes or does not take the water.
54. Q. What is the use of your measurement staff?—We have to retain a certain number, because in one year a certain number of leases lapse.
55. Q. Your measurements are not only on the applications for long leases, but subsequently for the rabi and perennial crops?—Yes.

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56. Q. (Mr. Muir-Mackenzie.)—Also for the season leases?—They are generally measured up about the time the applications are made: sometimes before, sometimes after. We try to measure them up before we grant the leases. The *kharif* season leases are in blocks.

57. Q. Could you tell us something about these blocks; what are the sizes of these blocks?—They vary very much. We have some 40 *bighas* or 25 acres. That is the smallest block. The rule is nothing less than 50 acres is leased. Some villages have 800 or 900 or 1,000 acres, perhaps more.

58. Q. I suppose you never have a block divided between two villages?—Sometimes we add a small area in one village to a larger block in another.

59. Q. For convenience?—Yes.

60. Q. As a rule, the block is village by village?—Yes.

61. Q. But you may have more than one block in a village?—Yes. We have more than one block; sometimes two or three blocks. However, I am trying to get them, so that all the leases expire simultaneously.

62. Q. Supposing some of the owners in those blocks do not want water. What happens?—If they do not all agree, that is to say, if a very small percentage is left out, we give in and grant a lease. But it must be a very small percentage. We generally wait till they all agree.

63. Q. If they do not all agree, you do not give a lease?—We do not unless there are a very few left out, and if there are a few, we try and catch them. We keep a watch on those who are left out. They have our special regard.

64. Q. That means an establishment?—Yes. Patrols go round to look after them.

65. Q. Then what do you do in regard to remissions?—No remissions can be granted on long lease lands, except specially under the Superintending Engineer's orders.

66. Q. On what grounds does he grant that?—If the field has been left uncultivated, he might grant it, or if the man has bolted.

67. Q. If the water has been available and the man does not take it, do you grant him remission?—Very rarely. I think in the last three years about Rs. 13 has been granted.

68. Q. Have you no claims for remission on the ground that the supply was not sufficient or regular enough?—We have had no such complaints.

69. Q. You never give remissions on that ground?—No.

70. Q. You never have applications for remission on account of irregular supply?—We may have had, but there have been very few complaints.

71. Q. Then practically you give no remissions?—None on the long leases.

72. Q. (Mr. Muir-Mackenzie.)—But you do on the season leases?—Yes, we do on season leases, but not on *kharif* season leases.

73. Q. (Sir Thomas Higham.)—Season leases are not entitled to water until long leases have had theirs?—Generally we look after the supply to the long leases first.

74. Q. A long lease has a preferential claim?—Yes.

75. Q. Therefore season leases might have a short supply?—Well, I don't recollect any cases.

76. Q. If there was a short supply, would you give remissions?—We don't give remissions generally in block areas, and the reason *kharif* leases are block areas.

77. Q. In *rabi* you give remissions?—Yes.

78. Q. And perennial?—Yes.

79. Q. On account of short supply?—It is generally failure of crop.

80. Q. From whatever causes?—It is generally not due to our short supply.

81. Q. Supposing crops were eaten up by locusts, would you give remissions for that?—We have done so.

82. Q. You don't make a regular practice of it?—No.

83. Q. What is the system of rotation in giving water?—It is given continuously to the people?—For ten days they get water consecutively, and then for five days they are shut off, and so on.

84. Q. That is the practice?—On the Patna side they have 12 and 4 days respectively. We shall probably reduce that to 10 and 5 days respectively. Ten and 5 days is the general system.

85. Q. (The President.)—What percentage of the lands are watered as a rule?—No. Fifty per cent. is what we

limit ourselves to a certain extent, but we do go up to 80 or 90 per cent. in a small village.

86. Q. Theoretically you irrigate about 50 per cent.?—Yes, so as to distribute the benefits of the water more evenly throughout.

87. Q. (Sir Thomas Higham.)—Then I understand your capacity is limited by what you can do in the first 15 days of October?—Yes, they must have water for the rice crop during that period.

88. Q. Both the late rice and the early rice?—Not the early rice. For the early rice they don't want the water; for the late rice they want it.

89. Q. In Macconchy's book he says that the duties are based on the total *kharif* area, not on the late rice area?—Yes, but the area of early rice is a very small proportion.

90. Q. The only time you have really fallen short in the *kathia* was in 1899?—Yes, in October 1899.

91. Q. What is the maximum supply of the canals?—4,500 cusecs in the main western system and 1,350 cusecs in the main eastern system.

92. Q. What did you do in 1899?—I distributed the supply between the three main branches.

93. Q. The three main branches are?—The Patna, Arrah and Buxar. The water was distributed between them according to area leased.

94. Q. Now you are refusing leases on account of the experience of that year?—To a certain extent we are refusing leases on account of the limited capacity of our canals. The capacity of our canals is only 6,350 cusecs.

95. Q. In 1899 you say you refused applications for 40,000 acres?—Yes. That is, where it was beyond our *kharif* limit, we could not extend the water there. Our canals only carry 6,350 cusecs.

96. Q. That is because you have not got the water?—Yes.

97. Q. The irrigation for large areas has naturally to be reduced when there is a want of water?—Yes, and we have not got the water. We cannot carry more than 6,350 cusecs. If you take 6,350 cubic feet and multiply it by 60, that gives about 380,000 acres.

98. Q. You can never do more than 380,000 in the *kharif* area?—I don't think so, unless we increase our carrying capacity, and we must also consider the water wanted in the *kathia*.

99. Q. You are limited by the water wanted in the *kathia*?—Yes; by the amount of water we can give during the *kathia*.

100. Q. What do you call the *kathia*, 15 days in October?—Fifteen days. It is a lunar asterism.

101. Q. Cannot it be stretched?—I have already said I think it can. I think in 1899 we practically did stretch it. It is the only year we probably did stretch it, but I think it affected the crop. I told the people distinctly that year when they came and crowded round my compound—"If you use the water carefully, you will get a very fair crop; you will not get a full 16-anna crop, but you will get 14-anna."

102. Q. You did not give many remissions?—No. We gave certain remissions, if they had a very bad crop.

103. Q. When leases fall, are they invariably renewed or is there any difficulty in doing so?—The people are always eager to renew them. They never let them drop, not if they can help it. We generally refuse those who will not comply with our conditions of making proper boundaries, improving their village channels, etc.

104. Q. Then if you have got so many applications, I suppose you have a strong hand?—Yes, we have. The *rayats* are very loth to lose a lease.

105. Q. The area that lapsed this year was 36,000?—Yes, and the total area applied for was 141,000.

106. Q. Have you a perfectly free hand in refusing or renewing a lease?—Yes.

107. Q. If a man has had a lease for seven years, could you say "we won't give it to you"?—If he does not comply with our conditions. Now water is so valuable here, people are eager to get it, and if they don't comply with the conditions, we do refuse them.

108. Q. But if they comply with the conditions, you don't refuse?—We never refuse.

109. Q. Have they any rights?—I don't think so.

110. Q. You do refuse them now and again?—Yes, we have refused them.

111. Q. When were the rates last revised?—The former rates expired in 1895-96 and were then revised.

112. Q. Were they raised then?—Yes.

113. Q. Is there any legal objection to their being raised at any time?—None whatever.

114. Q. Then it is a matter of supply and demand?—Just so. It is a matter of supply and demand; and also the benefits that the cultivators get from irrigation; I mean the extra produce they get.

115. Q. Supposing you said that instead of charging Rs. 2-8 for the long system leases, you would charge Rs. 3, there is nothing to prevent your doing that?—No. I think there is every reason for us to do so.

116. Q. It is now seven years since the rates were last revised? To whom does the present rate extend?—Up to March 1901.

117. Q. Is there any question of raising them then?—It is now under consideration.

118. Q. (Mr. Muir-Mackenzie.)—You cannot raise the rates in the middle of the lease?—No.

119. Q. (Sir Thomas Migham.)—How far does Government deliver water? Does it deliver it into each block?—Government delivers water up to each block. We are trying to get the channels extended well into the blocks.

120. Q. The Government channels?—We have no Government channels; they are all private channels.

121. Q. You have distributaries?—Yes, and they are Government channels.

122. Q. Do these distributaries go into the villages?—No.

123. Q. Is water brought into the edge of every village?—No.

124. Q. And the village channels may have to pass through another village?—Very often, and we have to acquire the land for these channels. Generally the people give the lands where the channel is in their own village. They can arrange this among themselves; if not, we require the land under the Act.

125. Q. Do you pay for the land?—Yes. The applicant for the village channel has to deposit the money in the Executive Engineer's office before any preliminary action is taken.

126. Q. Do you buy the land?—Yes. We take up the land under the Land Acquisition Act.

127. Q. Is there any objection?—Yes, they always want the channel to go another way. They always want to leave their own lands and put it in their neighbours.

128. Q. What is the length of these water-courses?—We limit them to 2 miles.

129. Q. What do you mean?—We don't allow them to go more than 2 miles from the distributaries.

130. Q. If they want to go further, do you make another distributary?—As we have not got the water, I throw out those applications, because lots of our distributaries run dry during the *kharrif* season.

131. Q. Does much waste go on in these water-courses?—There is not much waste, but there is a certain amount of waste, because some of the older channels are not in excellent order, and then again every year channels are damaged, because each man gives the channel a cut with his *kodati* and gradually the channels get into bad order, so that it is necessary after the seven years to be more particular that the channels should be brought into repair.

132. Q. Before you renew your leases you can insist on the repairs?—Yes, that is one of the points that I insist upon. I am very particular about that.

133. Q. (Mr. Muir-Mackenzie.)—With the irrigation so popular and the demand for water so keen, why is it that the anticipations as to the revenue likely to be realised on the Bone Canals have been disappointing? Is it because the canal has not carried as much water as you expected?—Well, first of all, the duty is much smaller than was expected, and then again the navigation has not come up to anticipations. Another reason is that the anticipations were made upon the large *rabi*-cultivation which has not occurred.

134. Q. You don't think you could increase the *rabi* cultivation by lowering the rates temporarily?—I would raise the *rabi* rates, because what has happened is exclusion of the *rabi* lands within the long leased blocks. They have all,

as far as possible, been converted into rice lands, and there is no *rabi* exclusively sown on them.

135. Q. Still I don't understand why you would raise the *rabi* rates?—There is generally enough moisture in these lands in ordinary years, so they are not leased except in bad years.

136. Q. You don't think, if you lowered the *rabi* rates, they would be inclined to take water?—I doubt whether the leased area of *rabi* would increase.

137. Q. Do you find that the value of land has increased very much?—From all I hear rents have very considerably increased.

138. Q. You know instances where rentals have considerably increased?—There is a very interesting paper on that subject by Mr. Luson. I have it here.

139. Q. At any rate it is your belief that the value of land has very largely increased. Rentals have also increased, have they not?—Yes.

140. Q. Even where the system of rentals is cash?—Yes, even in the cash rentals.

141. Q. Do you know how the landlord manages that in spite of the Tenancy Act?—I have heard landlords express the view that they can drive a carriage and pair through the Tenancy Act.

142. Q. (Mr. Rajaratna Mudaliar.)—Even in the case of occupancy tenants?—I believe so.

143. Q. (Mr. Muir-Mackenzie.)—The tenants find it best to keep on good terms with their landlords?—Yes. There is a sort of mutual self-help society between the landlords and tenants. There is no doubt landlords do a great deal of good in times when the *raiyats* are in want.

144. Q. You don't think that when the landlords' shares have been increased in value that it would be advisable to take an owner's rate from the landlords?—There would be very great objections to it on the part of the landlords. That ought to have been done in the first instance. I don't think it would be advisable to attempt it now.

145. Q. Because of the objections that would be raised?—Yes, although it would be quite justifiable to do so.

146. Q. (Mr. Rajaratna Mudaliar.)—You said that Shahabad was chiefly dependent on *ahars* before the canal was constructed?—Yes.

147. Q. Did the construction of the canal interfere with the old sources of irrigation?—No. They got the same drainage water into them as before, except perhaps from that little strip occupied by the canal.

148. Q. Are there no cases in which the canal interfered?—There may be one or two cases; I don't recollect any. I dare say there might have been where the canal took up an *ahar* itself. I think you will see that in Mr. Luson's note also.

149. Q. (The President.)—A note prepared for the Government?—Yes.

150. Q. (Mr. Rajaratna Mudaliar.)—In such cases you supplied the water displaced by the canal?—I think in most of them. The lands alongside the canal are nearly all leased.

151. Q. Where the old sources were interfered with, what do you do to compensate the zamindar? Do you supply water to the old irrigated lands?—Of course we do. As I say, we are supplying it to those villages alongside the canal which we interfered with.

152. Q. You supply water free to such lands?—Certainly not free.

153. Q. I find from some papers that water is supplied free from the Madhulani Canal?—Yes. That was constructed by a zamindar, and then afterwards bought.

154. Q. Is that in your jurisdiction?—It used to be.

155. Q. Why is water supplied free thereof?—You had better read the papers in the case; it is not in my jurisdiction now.

156. Q. Do you see any objection to the work of measurement and collection being done by one and the same staff?—I think one is a check upon the other. It would be most undesirable to have both done by the same staff. It is now done independently by the two parties, and one is a check upon the other.

157. Q. Could any saving be effected if the work were done by one and the same staff?—It could be done, but there will be no saving of staff. At present you might say the one is a sort of check upon the other. If the same

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man measures and makes out bills, the whole thing is in his hands and there can be no check over him.

158. Q. (Mr. Muir-Mackenzie.)—I want to ask you once again about the *rabi* area. Would not the cultivator, who now hesitates to take water, readily take it if the water-rates were lowered, say, in a season of good rainfall?—I do not think it would be a good thing to have a varying rate for the good and bad seasons. I think the rates are quite low enough now. I have recommended an increase of the rates.

159. Q. What is it here?—Here the rate is Rs. 2 an acre for *rabi*.

160. Q. Another thing I wanted to ask you about was with reference to compliance with a larger number of applications for leases. I understand that the number of applications complied with is limited to the amount of water supplied during the *hathia*?—Yes.

161. Q. Do you think it would not pay better to risk the supply running short in the *hathia* and grant remissions for failure of crop or for injury done, and to comply with the larger number of applications?—There would be enormous difficulty.

162. Q. This rarely happens?—I do not say it rarely happens. It happened in 1899, and though I do not say it will happen in this year, it may. The river is beginning to fall now.

163. Q. (The President.)—You have passed the *hathia*, have you not?—Yes.

164. Q. (Mr. Muir-Mackenzie.)—Then in 1899 you have told us that the cultivators did contrive to husband the water, and saved a good deal of their crop; they got their 14-anna and did not apply for remission?—Yes.

165. Q. Even if you had granted a few more applications it would have been consistent with giving a full supply through the *hathia*?—Yes, but the people would not welcome that system. A *rayat* would rather have his crop than his remission.

166. Q. You do not think it would be worth while to run a certain risk?—No, I do not think so. We might get up to 350,000 or 400,000, but I doubt if we will go beyond that.

167. Q. (The President.)—Can you give me any idea how much the capital account of the canals has increased by the splendid provision made for navigation?—I suppose about 50 lakhs on about 275 lakhs.

168. Q. That is about 20 per cent.?—Yes. The navigation works were very expensive and their maintenance is very expensive now.

169. Q. Did the navigation ever fulfil at all what was hoped it would before the railway came into these parts?—Never before the railway. During the railway construction we got up to the amount stated by Colonel Dickens by carrying their materials. We never had a large amount of traffic except when the railway was being made.

170. Q. Is it appreciated as a boon?—I think the people appreciate the steamer service on the canals. It is still going on.

171. Q. Was it at all in the district appreciated as a thing worth making a sacrifice for?—I think so. The steamers appear to run full. The gentleman who has bought the steamers and has hired them is reported to be a wealthy man.

172. Q. Has it done much good in the country as regards country boats?—I think it has done some good, but it has often to be sacrificed to the interest of irrigation. There is sometimes not enough water for both.

173. Q. It is killed now?—Well, I am told that the steamer traffic is killing the boats altogether, because the firm have reduced their rates.

174. Q. I did not know there were any steamers on the canals?—Two steamers.

175. Q. Don't they cut up the banks?—I don't think so.

Witness No. 17.—Mr. W. S. BREMNER, Executive Engineer, Eastern Sone Division.

(Replies to printed questions.)

A.

Mr. W. S.
Bremner.

25 Oct. 02.

1. The Buxar and part of Sasaram Sub-divisions in Shahabad and the portion of Gya and Patna Districts situated between the Poon Poon and Sone Rivers.

I have been for four years Sub-divisional Canal Officer at Sikrool in Buxar Division and for three years in charge of the Eastern Sone Division of the Sone Canals.

2. See statement.

B.

7. (1) It is possible to grow a second (*paira*) crop on almost all rice lands with the help of canal water. This can only be done in exceptional cases. The actual cash increase in value is about Rs. 8 per acre. In addition to this, the pulse crop has a beneficial effect in introducing nitrogen into the soil.

(2) The use of canal water permits the substitution of rice for *rabi* crop to a considerable extent where water is available. During the hot weather a much larger area of sugarcane can be grown than would be possible without it.

(3) (a) In a year of ample rainfall the use of canal water only increases the yield of rice crops, and that not to any very great extent. On average land, however, even in a year of ample rainfall, canal water is useful in enabling the cultivators to plant the seeds, transplant, and drain his lands at the right time. The draining of rice-fields in the *utranichatra* (middle of September) is of great benefit to the crop.

In a year of ample rainfall the use of canal water increases the yield on rice lands by about 10 per cent.

(b) In a year of scanty rainfall canal water is almost indispensable. Without it the crop suffers badly at each break in the rain, and agricultural operations cannot be carried on at the right time. The use of canal water in such a year increases the outturn of rice lands about 30 per cent. on the average.

(c) In a year of drought canal water is indispensable; no rice can be grown without it, and *rabi* crop cannot be sown on about 50 per cent. of the area.

In a year of drought canal water increases the yield of rice lands about 200 per cent., that is, a normal crop can be obtained instead of 30 to 40 per cent. of the normal. On

rabi lands the increase is about 100 per cent., as without it the crop can only be sown on half the area.

8. (1) On lands under long term leases, Rs. 12 per acre.

On lands under season leases, Rs. 8 per acre.

(2) On lands under long term leases, Rs. 30 per acre.

On lands under season leases, Rs. 20 per acre.

9. (1) Rs. 3 per acre on the average. This is paid on the area irrigated except for long term and *kharij* leases, in which case it is paid on the area entitled to a supply of water.

(3) Nil.

10. The construction of village and field channels. The village channels are made by the landlord in case of *dhaoi* land, that is, where the crop is divided. Where rent is paid in cash, village channels are, as a rule, made by the cultivators unless the landlord has a direct interest in the irrigation. Field channels are made by the cultivators. Wherever actual cash expenditure is incurred, the work is done by the landlord. If expenditure is incurred by individual cultivators on construction of village channels, rent for the use of the channel can be recovered under the Bengal Irrigation Act, provided the person who spent the money is registered as owner of the channel.

11. None in the districts of Shahabad, Patna and Gya with which I am acquainted. The slope of the country is fairly steep, about 2 feet per mile, and the water flows off freely if not obstructed.

Statement showing the average rainfall, month by month, for the year 1901-1902.

Station.	April 1901.	May 1901.	June 1901.	July 1901.	August 1901.	September 1901.	October 1901.	November 1901.	December 1901.	January 1902.	February 1902.	March 1902.
1	2	3	4	5	6	7	8	9	10	11	12	13
Daukipore	0.00	1.20	0.83	12.08	10.18	5.22	0.62	0.03	0.00	0.00	0.05	0.01

1. Q. (The President.)—You are Executive Engineer of the Eastern Sone Canals?—Yes.

2. Q. How long have you been here?—Four years in April next.

3. Q. Where were you before?—One year in Orissa; before that five years in Shahabad.

4. Q. Then you know the country well in these parts?—Yes.

5. Q. Is there any value attaching to the silt carried down by the Sone river?—Cultivators attach great value to it.

6. Q. In all seasons of the year?—It only comes during the *khari* season.

7. Q. It has alluvial matter in it?—Yes; it improves the fields close to the outlets very much.

8. Q. You have submitted a paper upon the *Gya pains* and *ahars*. These *Gya* works have not come under you?—No; a great part of the district is in my jurisdiction; however, I have the Grand Trunk Road through the *Gya* District; also civil buildings.

9. Q. Do you consider there should be provision of masonry head-works on *pains*?—Yes, that is very important.

10. Q. Who should pay?—The landlords.

11. Q. Would they pay do you think, or would they consider it a hardship?—I don't think they would consider it a hardship to pay. A great many of their *pains* owing to the absence of head-works have become too wide, and damage is done which they are trying to remedy, but cannot do so.

12. Q. Is there any sort of maintenance establishment? Are there patrols?—No, the Tahsildar with the cultivators manage them.

13. Q. Have you seen anything of the disputes among zamindars?—I have never been personally in any of the disputes; several of them have come to my knowledge when travelling about the country.

14. Q. Would you recommend putting *pains* and *ahars* under professional charge?—I think some Public Works officer should be required to inspect them once a year when the time came for repairs and to prepare rough estimates of what should be done; this should be sent through the Collector. If work was not started within a reasonable time, Government should take it up.

15. Q. You consider that the Executive Engineer should have the responsibility?—In most cases it would only be a line of levels and an estimate.

16. Q. Do you consider it should be put under a Public Works officer, or should there be special district provision for it?—A special officer, I think; not a man in the position of Executive Engineer.

17. Q. You say in your memorandum "the question of the prevention of *bunds* across the rivers is a more difficult one. The supply of water in all the rivers in years of scanty rainfall is not sufficient for all and the need of water is so great that it would require an armed force to prevent the cultivators making a *bund* across a river when they saw their own crops dying; and water going past which could save them." That requires very elaborate arrangements; you would have to see not only that there was a law, but that the law was carried out?—That would require a great deal of care no doubt; most *pains* want work without a *bund* when the river is low.

18. Q. I gather you would not interfere with *ahars*; you say in your note "the construction and maintenance of *ahars* is, in my opinion, best left as it is. The landlords and cultivators understand the principles under which they can be worked satisfactorily. By these means a large quantity of water is stored for future use, and given good rain in August and at the end of September the crop dependent on them is assured"?—That refers to the *Gya* District where the thing is managed very well. They want masonry outlets.

19. Q. I suppose there are a great many of these *ahars*?—Yes; as a rule, a few outlets would irrigate the area commanded.

20. Q. Have you any acquaintance with the Bhabna Sub-division?—No; my jurisdiction extended to the Buxar Canal.

21. Q. You know nothing about the Karamnassa project?—No, except what I have seen looking through the papers.

Ben.

22. Q. Have you any suggestions for increasing the supply of the canals? Is there any means of doing it?—On this side of the river we still have room for improvement, but not on the other.

23. Q. You are not tight for water?—As a rule, there are only 200 cubic feet spare, for which leases have not been given. The people are inclined to be somewhat lazy and won't do what we tell them.

24. Q. (Sir Thomas Higham.)—You say it is possible to grow a second crop of rice with the help of canal water. Is that second crop that you refer to charged as a separate crop?—No.

25. Q. If a field has been watered for a rice crop and then *rabi* is grown, don't you charge for it?—We charge for the *rabi* if he has to plough his land and then sows again, if water is taken after the rice is cut.

26. Q. Can you always tell when that is?—Yes, by the nature of the crop, but if it is a *patra* crop, then no charge is made.

27. Q. Are measurements made by your own men?—The patrol does it first.

28. Q. You say in a year of rainfall the use of canal water increases the yield 10 per cent. How do you arrive at that figure; is it based on anything?—Yes, it is arrived at by a comparison of similar figures in a year of ample rainfall and by experiments made every year in the fields.

29. Q. Do you weigh the outturn?—We take the whole of one plot, say, one-eighth of an acre, have it thrashed out in our presence and weighed.

30. Q. Is 10 per cent. generally accepted as a fair statement of the increase due to irrigation?—I think so.

31. Q. How much does that mean?—Two maunds an acre.

32. Q. (Mr. Allen.)—Two maunds of paddy or rice?—Two maunds of paddy.

33. Q. (Sir Thomas Higham.)—With regard to what you say in paragraph 8 (1), I don't understand how the term of the lease affects the produce?—Long term leases have the advantage that they are sure of the water and get it at once.

34. Q. With regard to what you say in paragraph 9 (1) as to the rate being Rs. 3 per acre on the average, is that not above the actual rate?—I take two-thirds of the area at Rs. 2-8; the *rabi* area is very small and sugarcane is Rs. 1 an acre.

35. Q. You don't answer the question whether the cultivator pays anything to the owner of the land on enhancement of rent?—I am not fully acquainted with the subject.

36. Q. You don't know whether he does?—I know the landlords are always trying to raise it, but they have difficulty in doing so.

37. Q. How does he do it?—One way is that in *bhaol* they will not agree to convert into *nakdi* unless the man pays a very high rent. If the village is *nakdi* and improvements are required, he will not assist the cultivator if he can help it unless a higher rate is paid.

38. Q. Do the landlords pay part of the water-rate?—I *bhaol* they settle it with cultivators. On this side of the river they help the cultivator.

39. Q. When you got these applications for big blocks, do they water every acre in that block every year?—Yes.

40. Q. Have you not such things as fallows?—No. They usually have two years paddy and the third year sugarcane.

41. Q. Do you ever fill up any *ahars* outside the blocks?—No, because they won't buy the full quantity of water.

42. Q. What is the rate for selling water?—Re. 1 p cubic foot per second for 21 hours.

43. Q. Do they ask for water to *ahars* on payment?—Very seldom.

44. Q. Supposing there is water going, do they never as you to fill up their tanks?—We fill their cattle tanks free but not *ahars*.

45. Q. (Mr. Muir-Muckenzie.)—I understand you hardly consider it practicable to prohibit the making of *bunds* across the rivers altogether?—I think it would be very difficult to do it.

46. Q. Would it be possible to ascertain the potentialities of the rivers and decide where *bunds* should be erected?—

Mr. W. S. Bremner.

25 Oct. 02.

Mr. W. S.
Brenner.

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Yes, that might be done. Landlords have certain rights now; I presume you would not buy them out.

47. Q. The rights are ascertained?—Yes.

48. Q. You said you had roads as well as buildings; do you find that the work of irrigation officers is interfered with by their other duties?—This is a comparatively light irrigation division; the area irrigated is 90,000 acres.

49. Q. Is it within your power to grant remissions?—For failure of crop we grant ten-anna remission.

50. Q. The total remission is small?—Yes, a small amount is granted every year owing to blight, etc.

51. Q. You don't limit the remission to failure of crop?—No, if there is a failure of water we give total remission.

52. Q. That is very rare, I suppose?—Yes.

53. Q. What is the agency for determining the remission, do you inspect yourself?—The Sub-divisional Officer has a zilladar and other officers; he either inspects himself or deputed a zilladar to do it; they go to the spot and take the evidence of the patrol and headman of the village.

54. Q. Remission is not granted without complaint to you?—No.

55. Q. As regards repair of *pains*; Mr. Oldham recommends interference by the Collector only on the complaint of cultivators; would you go further; do you wish repairs to be enforced merely on inspection?—I think repairs should be enforced on the inspection of some responsible officer.

56. Q. You would not wait for the complaint of the cultivators?—They would not complain.

57. Q. Would not that mean an enormous amount of work; the maintenance of a considerable establishment?—I suppose two supervisors for Gya would be enough.

58. Q. And nobody under them?—No.

59. Q. You would not recommend any such inspection in the case of *ahars*?—*Ahars* in Gya are kept in fairly good order.

60. Q. (Mr. Rajaratna Mudaliar.)—As regards the measurement of irrigated lands, who checks the zilladar's measurements?—The *amin* measures and the zilladar checks.

61. Q. It does not go to any higher officer?—No.

62. Q. The measurement of zilladar is sufficient?—The greater part of the area is cadastrally surveyed and it is taken from that.

63. Q. Are the blocks demarcated with stones?—No, on the cadastral map they are bounded by a line; the *amin* takes the map and fills in the block; he measures every field within the line.

64. Q. Supposing a man cultivates beyond the line?—Then we cannot assess him; we cannot assess beyond the boundary; he gets the benefit of it.

65. Q. A block may be 50 acres, he may irrigate 10 acres beyond the line?—Then he gets the benefit.

66. Q. Don't you fine him?—Under the law we cannot do anything; we merely make a note of it.

67. Q. (Mr. Muir-Mackenzie.)—Do you think a very much larger area is irrigated than is entered in the leases?—Yes.

68. Q. Don't you think it would be reasonable to assess a man who goes outside his block?—We cannot do it.

69. Q. (The President.)—I think it is a very good thing

and tends to encourage economy of water. If a man irrigates his track of, say, 50 acres and thinks he can add 10 acres to it, it will be to the advantage of the country?—We take good care not to give out leases to blocks from which water could be easily taken beyond the boundaries.

70. Q. (Mr. Muir-Mackenzie.)—Don't you think it would be reasonable to charge something for water that is drained out?—It would lead to a great deal of complaint; you turn the water to their lands; they don't come and take it.

71. Q. (Mr. Rajaratna Mudaliar.)—What is the pay of a zilladar?—Rs. 50 to Rs. 100.

72. Q. The Sub-divisional Officers do not check the figures of the zilladar; do they?—No.

73. Q. Is there any rule on the subject?—No, the block system prevents any wrong measurement; after measurement of the area the block is taken out of the map and a comparison made.

74. Q. In the absence of demarcation, do you think the block system is of any use?—The block system enables us to check the area.

75. Q. How is the excess area discovered?—The patrol after a little practice can very easily tell from the map.

76. Q. Since the excess area is not charged for, do you think there is any inducement on the part of the patrol to bring it to your notice? Can he not be easily bought off?—I dare say he can, but we can catch him and then he is punished. We make it our business to give out leases to such blocks, as we will not lose by. The block is demarcated by a ridge all round, that is one of the conditions of granting a seven years' lease; the cultivators make a ridge 18 inches high and a foot wide at the top.

77. Q. (Mr. Allen.)—You spoke of a considerable area being irrigated for which nothing is paid, can you give any figure?—It varies with the different years; our canals supply enough water to irrigate the whole area in a dry year; if you get one inch of rain 33 per cent. goes beyond the boundary.

78. Q. About this Gya question you say two supervisors could go over the district and see after the *pains*; what is the number of *pains*?—150 to 200.

79. Q. Have you any idea of the mileage?—I don't know. If the supervisors started in November, they would have finished the inspection of these *pains* by January.

80. Q. Is your scheme confined to the main *pains*?—Yes, I should only take up the main *pains* and ensure that they got a good supply.

81. Q. It is the head-work that you would confine yourself to?—Chiefly.

82. Q. We have had a proposal from Mr. Oldham that the Collector should look after streams in Gya. How many *ahars* would there be?—They would run into a thousand. There is a great part of Gya where there is no irrigation whatever; the northern half only would have to be considered.

83. Q. There is probably one *ahar* in each village?—About that. There are very little south of a line taken from Aunagabad to Nawada.

84. Q. You said irrigation would give 2 maunds of paddy per acre; what do your crop cuttings show irrigated per field?—They vary very much. Unirrigated crop would give you 17; irrigated comes to about 20.

85. Q. Is that in a year of good rainfall?—Yes.

WITNESS No. 18.—BADU SARODA SUNDER PAL, Executive Engineer, Buxar Division.

(Replies to printed questions.)

A.—GENERAL.

Babu
Saroda
Sunder Pal.

25 Oct. 02.

1. The answers refer to that portion of the district of Shahabad which is commanded by the Sone Canals. I have been employed on irrigation works in this district for the last seven years and-a-half.

2. Statement attached.

3. (1) No.

(2) No.

(3) No. The cultivators do not care much to manure ordinary fields, nor have they got sufficient for all their fields.

(4) Hardly any. There are black soils to which irrigation does not do much good, but such soils are not extensive.

In case of failure of rainfall, such soils also sometimes require water for cultivation.

(5) Yes. The maximum capacity of the Sone Canals has almost been fully leased out, and in case of drought some of the area under command cannot be irrigated or cultivated.

(6) No.

(7) } Yes. There is some obstacle where the cultivators

(8) } have got no right of occupancy, nor can they claim any fixity of rent.

(9) No reason I know of, except those noted above.

4. I have not got much personal knowledge on this point. For the land irrigated from the Sone Canal system, the land

rent is enhanced by the zamindars when the lands come under a long-term lease. I think the existing provisions are sufficiently liberal.

5. I have got no personal knowledge on this point.

6. Not much. The cultivators will migrate to the irrigated areas, if it be not too far off their old homes. During my tours in the interior of this district, I have come across some half-deserted villages situated far from the canals, from which the cultivators are said to have migrated to irrigated areas. Instances are villages Pachouna, Bisi, Basawan, Dohra and Hethun. The people are very anxious to have the irrigation extended.

B.—CANALS OF CONTINUOUS FLOW.

7. (1) One and-a-half times nearly.

(2) Almost double.

(3) (a) Not much.

(b) Double.

(c) Ten times.

8. (a) About one and-a-half times.

(b) In a year of drought the crop on most of the unirrigated area ranges from nominal crop to almost or total failure, and the difference becomes out of proportion.

9. (1) Rs. 2 for the *rabi*, Rs. 2-8 for long-term lease, and Rs. 3-8 for annual *kharif* and for rice, and Rs. 4-8 for the hot-weather crop in form of water-rate.

(2) Rs. 2 to Rs. 8 in the form of rent.

(3) *Nil*.

10. The construction of suitable channels is necessary. This is done mostly by the cultivators and sometimes by the landlords. In the latter case the landlord gets the channel rent for the use of his channel from the tenants. Where the cultivators make the channel, their security consists in the certainty of tenure and expectation of good yield.

11. No damage I know of has been done to the people. The sandy soils are improved rather than deteriorated by irrigation. Too profuse, too extensive, and too frequent irrigation, which the cultivators are prone to take, water-log the soil, and generate malaria, and thereby deteriorate the climate. This can possibly be remedied by proper draining of the lands and restriction of supply to proper quantities just necessary for the maturing of the crops. This will come on gradually as the cultivators are taught their necessities by proper enforcement, with discretion, of the intermission of supply (*tatil*) according to the necessity of the crop. The irrigation and its evil are of 25 years' standing. I think it is not increasing. Intermission in the supply by *tatil* system was introduced a few years ago, and is being gradually enforced everywhere, and is expected to check and diminish the evil. I have not got experience of draining the irrigated areas: I believe drainage will improve the lands as well as the climate. There is no improved drainage system in the district coming within my observation.

D.—TANKS.

28. There are no big tanks in the district I know of hardly any worth the name.

(1) The small tanks, called *aharas*, are filled with drainage water of the country.

(2) The water is taken to the fields through small channels, and mostly lifted to them by means of ordinary water-lifts, such as *dhouries*, *dum*, etc.

(3) (a) Throughout the year, except the hot months.

(b) During the rainy season only.

(c) *Nil*.

(4) That varies from 50 to 400 *bighas* according to the size of the tank.

21. (1) About one and-a-half times from big *aharas*.

(2) Hardly any, as the tank generally fails during the year of drought.

(3) (a) *Nil*.

(b) Double.

(c) *Nil*.

25. (1) 25 to 75 per cent. according to the delay.

(3) 90 per cent., and if not, cent. per cent.

26. In year of scanty rainfall well irrigation is resorted to at the end of the season. This is very essential, but few can do it, and the results cannot be very satisfactory for the rice cultivation.

27. (1) 50 per cent.

(2) *Nil*.

28. (1) Nothing, except manual labour for repairs to the tank and channels.

(2) Not much, although they have to pay a little enhanced rate of rent on area irrigable.

(3) Nothing.

29. The expenditure is in lifting the water to the fields and making the channel. This is done by the tenants.

30. By the tenants. I have taken no notes on these points. I think no legislation is required.

31. Other owners get water only, if available, at a nominal cost. No legislation exists for this district, nor any required.

32. Yes, by advances under the Land Improvement Loans Act.

33. The silt deposited is not much, and is generally removed by tenants by the hand, whenever necessary.

E.—WELLS.

34. I have examined carefully only the area commanded by the Sone Canals.

(1) The average depth of water in the permanent wells vary from 10 to 30 feet according to the localities.

(2) The supply is from both percolation and springs, and that from percolation generally fails in years of drought, and that from spring, partly. I know of no well being unfit for use from the water becoming too saline.

(3) The average cost of construction varies with the dimension and the depth to which it is sunk. I have seen wells constructed for Rs. 100 only. But big wells cost sometimes as much as Rs. 500.

(4) The permanent wells last for a long time. I have seen wells in use, which are said to have been constructed two or three hundred years ago.

(5) The water is usually raised by *mots* worked by bullocks, and also by *lathas* worked by men.

(6) That depends on the size of the well and the depth of water in the same. Some wells will irrigate as much as 25 *bighas*, and others not even 4 *bighas*.

(7) I cannot say.

35. (1) One and-a-half times.

(2) As much as double.

(3) (a) *Nil*.

(b) About double.

(c) About five times.

36. (1) Cent. per cent. by substituting more for less valuable crop.

(2) Ten times, as the produce on the unirrigated area in a year of drought is very small, if any at all.

37. (1) About double when the well is made by the zamindar, and nothing when it is made by the cultivators themselves.

(2) Nothing.

38. (1) The cultivators have got local experience, and that is their guide; no serious difficulty is experienced.

(2) Yes. For want of capital in many cases. I know of no such assistance being offered.

39. No. The zamindars will do it when they are sure of getting their lands cultivated at an enhanced rate.

40. Yes. They are a great protection against drought. Their construction may be encouraged in a year of scanty rainfall by advances of money at the rate of Rs. 5 to Rs. 10 for each well, including the price of *mot*, etc., to be recovered from the cultivators when the crop is harvested.

Babu
Saroda
Sunder Pal.
25 Oct. 02.

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Rainfall statement for the last ten years.

Month.	1892-93.	1893-94.	1894-95.	1895-96.	1896-97.	1897-98.	1898-99.	1899-1900.	1900-1901.	1901-1902.	Total.	Average for 10 years.
April	0.00	0.08	0.02	0.68	0.00	0.07	0.00	0.34	0.01	0.00	1.21	0.12
May	0.15	1.69	0.00	0.23	0.28	0.13	0.59	0.41	0.40	1.67	5.45	0.54
June	5.32	6.50	7.39	4.32	8.64	5.23	4.11	11.17	4.08	0.23	57.02	5.70
July	8.81	12.24	20.36	17.08	8.68	11.09	10.20	20.53	10.42	7.32	127.42	12.74
August	22.52	7.37	10.52	16.31	7.39	14.23	17.47	10.75	5.65	13.63	131.64	13.16
September	2.72	10.24	5.26	7.92	2.66	4.24	11.41	2.23	8.36	4.20	69.74	5.97
October	0.08	8.47	10.80	0.60	0.00	4.20	0.30	0.86	1.68	0.82	27.81	2.78
November	0.60	0.78	5.26	0.60	0.45	0.60	0.00	0.00	0.00	0.01	7.13	0.71
December	0.00	0.00	0.08	0.50	0.37	0.00	0.04	0.00	0.97	0.00	1.96	0.20
January	0.66	0.35	0.43	0.00	0.01	0.00	2.43	2.96	2.61	0.00	9.45	0.94
February	1.56	1.60	0.44	0.00	0.63	1.87	0.05	0.33	1.45	0.00	8.33	0.83
March	0.88	0.09	0.11	0.00	0.43	0.00	0.00	0.00	0.54	0.00	2.10	0.21
Total	43.30	49.51	66.67	47.64	29.81	41.66	46.69	49.58	36.61	27.79	439.29	43.93

1. Q. (*The President*.)—You are Executive Engineer of the Buxar Division?—Yes.

2. Q. Have you been long in the Division?—I was there twice—once in 1895-96 and again last year.

3. Q. You say in paragraph 4 "there are black soils to which irrigation does not do much good." What are these black soils; does rice grow on them?—They grow very little rice; they generally grow wheat.

4. Q. Is it a good crop of wheat?—Yes, the area is pretty large.

5. Q. Do they try cotton upon it?—No.

6. Q. Have you seen that soil in other parts of the country?—No.

7. Q. Where were you before you went to Buxar?—I was all along in Shahabad.

8. Q. The Buxar Canal passes through Bhabua?—Yes, a part of it does.

9. Q. Do you know Bhabua well?—Yes.

10. Q. Do you know this scheme for a reservoir in the hills?—Yes, I have been in the hills to investigate it.

11. Q. Did you take any levels?—No, the season was not suitable for it; it was in the rains.

12. Q. Did you make any observations?—I only went over the country to see if the sites were suitable for rice cultivation.

13. Q. Did you inspect the site?—I saw the Durgaiti site; that was the smaller one.

14. Q. The country is all covered with jungle?—Yes, where the reservoirs are proposed to be constructed.

15. Q. Do you think people would be glad to have irrigation there?—I think they would readily take water.

16. Q. Could anything be done to supply the Buxar Canal; could you send more water into it?—People would take water gladly, but the Buxar Canal cannot be supplied from these reservoirs. The levels will not allow of it.

17. Q. In reply to question 11 you allude to the evils done by over-irrigation; is there much of this evil?—Yes.

18. Q. You say in your note "too profuse, too extensive and too frequent irrigation, which the cultivators are prone to take, water-logs the soil and generate malaria and thereby deteriorate the climate." Is there much of this evil?—Yes.

19. Q. And is the land injured?—The climate is injured.

20. Q. About what proportion of the village land do you irrigate?—50 to 60 per cent.

21. Q. That is rice?—Yes, besides that we also get some rabi.

22. Q. You say the climate is injured. Is there clear proof of that?—There is more fever now than before.

23. Q. You say in the same paragraph—"Intermission in the supply by *tatil* system was introduced a few years ago, and is being gradually enforced everywhere and is expected to check and diminish the evil." Has it checked the evil?—It has not already checked the evil. If it is enforced during the rabi and dry weather seasons, there will probably be no evil.

24. Q. As regards the Bhabua Sub-division, supposing it is too expensive to make the Katamnasa reservoir, what could be done for the Division to ward off famine?—Utilize the water of the local streams.

25. Q. Could nothing be done by wells?—No.

26. Q. Why?—They irrigate very little from well.

27. Q. In other parts of India they irrigate a great deal?—I think the cultivators here are lazy.

28. Q. Could anything more be done by *ahars*?—There are some *ahars*, but they are not of much use. In a year of deficient rainfall they do not fill up.

29. Q. Have you navigation in the Buxar Division?—Very little now.

30. Q. Why is that?—The traffic goes by rail.

31. Q. Did the people like it?—When there was no railway people went by steamer.

32. Q. Are there locks in the Ganges?—Yes.

33. Q. Are they used?—Very little. Hardly any boats now go up the Buxar Canal.

34. Q. Are there locks there?—Yes, but they are seldom used.

35. Q. (*Sir Thomas Higham*.)—You refer in your memo. to *bighas*; what is a *bigha*?—The standard Bihar *bigha*, $\frac{1}{16}$ th of an acre.

36. Q. You say that the *rayats* get a great deal more water than is necessary for their crops. What is the standard supply?—One cubic foot per second for 50 *bighas*.

37. Q. If you have a block of 100 acres, you give two cubic feet per second night and day?—Yes, for ten days.

38. Q. Do you think that too much, or do they take too much?—I think that is too much. I have tried in Arrah to get it reduced to 62½ acres and have succeeded.

39. Q. Is that a regular rule of canals to allow one cubic foot per second for 50 acres?—Formerly it was.

40. Q. Is that the rule of the Superintending Engineer?—Yes. But for the last three years we have changed that.

41. Q. You only allow that ten days out of the 16?—Yes.

42. Q. How did you ascertain that?—I found it out by experiment.

43. Q. Some of our witnesses say they don't get enough of water?—In certain Sub-divisions there was no complaint of short supply.

44. Q. Does water run continuously on the fields, or is it shut off when a field is filled and passed on to the next?—It runs continuously for ten days.

45. Q. You say there are obstacles to the extension of irrigation; what are they?—They will not take long leases, because they are not certain of remaining in possession of the fields; they might be turned off while remaining liable for the water-rate.

46. Q. Are the only people who take long leases those who have rights of occupancy?—Mostly.

47. Q. (*Mr. Muir-Mackenzie*.)—In reply to question 4 you say "for the land irrigated from the Sone Canal

system the land rent is enhanced by the zamindars when the lands come under a long-term lease." Does that apply equally to lands in which the rents are cash or *dhacoli*?—Yes, to both.

48. Q. We have had some evidence that the zamindars enhance rents; when there is a cash rent, how does he manage it?—First, he makes difficulties in irrigation; he will arrange that the people should not get water; when they do irrigate their fields and see the benefit of irrigation and ask for long lease he puts difficulties in the way.

49. Q. Do you know any instances of this?—I have seen rents of fields raised from 4 annas to Rs. 4.

50. Q. Were these occupancy tenants or tenants-at-will?—I don't know.

51. Q. You say in answer to question 34 (d) "the permanent wells last for a long time. I have seen wells in use which are said to have been constructed two or three hundred years ago." Are these large and expensive wells?—Yes.

52. Q. I suppose these wells that cost Rs. 100 would not last very long?—No.

53. Q. What is the cost of the big wells?—From Rs. 500 to Rs. 1,000.

54. Q. Have they 3 or 4 *mots*?—Yes.

55. Q. And they are *pakka*?—Yes.

56. Q. Would a hundred rupees well have a single *mot*?—Yes.

57. Q. (Mr. Rajaratna Mudalliar.)—With regard to what you said about 1 cubic foot of water being sufficient for 100 *bighas*, what was the nature of the experiments you made?—I took a note of the water discharged from the outlets for 7 or 8 days and then worked out the area.

58. Q. Did you test the outturn from the fields in which you made experiments?—Yes.

59. Q. In different systems of irrigation?—I compared the outturn with the previous experiments on the same fields; it was not inferior.

60. Q. How many experiments have you made in that way?—Ten in each year.

61. Q. As regards actual outturn?—Yes.

62. Q. And in the same fields?—Yes.

63. Q. Did not the *raiya*s complain that owing to intermittent supply their outturn was diminished?—No, they did not complain to me at least.

64. Q. (Mr. Muir-Mackenzie.)—You know Bhabua?—Yes.

65. Q. Do you feel confident that the people there will readily take irrigation?—Yes.

66. Q. Supposing there was a year of good rainfall immediately after water is introduced will the people hang back, do you think?—In certain parts they cannot do without water even in a year of good rainfall.

67. Q. (Mr. Allen.)—You said non-occupancy tenants would not take long leases for fear of being turned off and still be liable for the water-rate, would the Irrigation Department not reduce rates?—In some instances the men fled from the villages and we did reduce the rates.

68. Q. You would not levy your water-rates on a man who had abandoned his holding?—No.

69. Q. With regard to what you said about enhanced rents, what sort of land was that on which the rents were raised?—Sandy.

70. Q. Is *salami* paid by *raiya*s before they work a well?—I have not heard of it.

71. Q. (Mr. Muir-Mackenzie.)—Can you give instances where rents were enhanced?—Yes, in Deogana, Dharupur and Amal. These came to my personal knowledge in the Arrah Division.

Babu
Sarada
Sunder Pal.
25 Oct. 02.

THIRD DAY.

Muzaffarpur, 27th October 1902.

Witness No. 10.—MR. E. T. SCALY, District Engineer of Champaran.

1. Q. (The President.)—You are, I understand, District Engineer in the Champaran District?—Yes.

2. Q. And have you been there for a long time?—Twenty-six years.

3. Q. Then you must have seen it (through all the so-called famines?—I did not see it in the first year of famine. I was in Champ in 1874. But I have seen everything since 1876 when I came here.

4. Q. Looking at the number of men employed on famine relief work, you never had works on a very large scale in Champaran?—In 1896-97 there was a good deal, but not before.

5. Q. I see that in the north-west part nine per cent. were employed and the rest from three to eight per cent. in the south?—Yes.

6. Q. From what you know of the district do you think that famine protection is necessary all through it?—In some years it is of great advantage.

7. Q. In all parts of the district?—All north of the Sikrana probably.

8. Q. Has there been any distress south of the Sikrana?—Not to the same extent as in the north.

9. Q. What is that due to; the rainfall?—Yes.

10. Q. I gather from these papers that there is practically no irrigation south of the Sikrana?—No, the people will not irrigate south of the Sikrana. They say the soil deteriorates from irrigation, and they must be very hard up indeed to use water. I have no doubt it would be useful at times, but then they are afraid to use it, because they say that if once they use water, they will always have to use it afterwards.

11. Q. There was no famine there?—There has been scarcity, but I should not call it actual famine.

12. Q. The state of the country is better here than north of the river?—North of the river is principally rice cultivation, and when the rice fails, the cultivators have nothing to fall back upon. South of the river they have several crops, so that if they lose one they generally get one of the others.

13. Q. That is really the difference?—That is the principal reason.

14. Q. So in a year of drought, if the people to the north of the Sikrana could turn themselves to something besides rice, they would be just as well off as those to the south of the river?—You cannot grow *rabi* there without irrigation, or the *rabi* you do grow is very poor.

15. Q. Have you been concerned in these irrigation schemes in the Tribeni?—I have always taken great interest in those schemes, and during the famine of 1897 I was in charge of the famine work on the Tribeni Canal.

16. Q. But you have not to do with it now. It is an Imperial work?—Yes.

17. Q. And the other schemes have you anything to do with them?—Yes, with a small scheme near Ramnuggur where in 1897 we made a *pain*. That has been under my charge since then. Subscriptions are levied on the people that want the water: they pay the money when asked for it.

18. Q. What river is that from?—It is from the Massan.

19. Q. Is the irrigation very extensive?—About 15 miles in length and an average of 3 or 4 miles in width.

20. Q. Have you been called upon to do much or to do anything for the *pain*; I mean for the clearance of it or for the rectifying of it in any way?—I have a man in charge who takes steps under my orders to carry out any work that is necessary.

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21. Q. Are district funds called upon to do that?—It is entirely paid for by subscriptions levied according to the area of irrigation.

22. Q. Does that work well?—Yes, it works without any trouble.

23. Q. There is no great difficulty about getting the money?—I have had no difficulty. They send their money to the Collector on the estimate made out by me.

24. Q. Then every time you have work to do, have you to ask them whether they are willing to pay for it?—No. We levy a rate per *bigha* per year, and I have had a surplus generally and that is brought on to the next year.

25. Q. Then you frame a budget for the year?—Yes.

26. Q. How much does it cost a *bigha*?—Last year it was six annas. This year there was a surplus and so we brought it down to three annas.

27. Q. What is the *bigha* here?—9½ to 10 *kathas*.

28. Q. What part of an acre?—It would be about two acres per *bigha*. A *bigha* a little further to the west is as much as 13 *kathas*.

29. Q. Now within this cess have you ever carried on any masonry work?—No, we have not done anything. We have built a small wall across one *pain*, but you would not call that a masonry work.

30. Q. Could the system you are working upon be extended so as to get proper masonry weirs for these *pains*?—Yes, I think so.

31. Q. Do you consider they are necessary?—I think they are very necessary. They would be a great advantage to the country generally.

32. Q. Is there much dispute as regards the irrigation? Do the people far down the *pains* make it a grievance that they are cut off from the water by the upper people?—They complain that they do not get as much water as they would like. That of course is a thing we have no control over. The water is limited to the rainfall.

33. Q. Is there any sort of understanding, written or unwritten, as regards each man's share?—On our *pain* we divide the whole length into four sections. The duties are fixed on the area, and each section is watered for so many days; and this is carried out regularly right through.

34. Q. (Sir Thomas Higham.)—There are no *pains* above yours?—No.

35. Q. (The President.)—The irrigation in the upper part is obliged to be used to let the water pass?—Yes.

36. Q. And is that carried out to the satisfaction of the people generally, or are there disputes?—I have not heard of any cases where it has been flagrantly upset.

37. Q. Do you shut them up?—Yes. If it were left to the people, they would not shut it up.

38. Q. What you are saying applies to the *pains* in general, or just to that particular one from the Masan? You are aware that there are a number of rivers in the district used for irrigation. Does what you have said apply to them all?—Certainly.

"(The President.)—Mr. Kilby has given us a paper in which he says:—"When it is found that any one person is appropriating to his own use the whole of the water of any particular stream, the order that is generally passed is that he must make a *ghanj* and allow half of the water to pass on. This is unsatisfactory, as obviously those who have *bunds* high up the stream get a great deal more water than those below. A *ghanj* can be easily tampered with. Anyone can stop it at night with a few basketfuls of earth. Detection in such cases is very difficult, as it is situated in the locality of people who wish to stop it and far from those persons living lower down the stream who wish it to remain open. The *ghanj* system is in every way unsatisfactory. A better system is of fixing dates on which villages along the course of any stream shall be allowed to take water from it. This is done in the case of the Masan *pain* which is under the control of the Executive Engineer. Government has a right to the control of the water of this *pain* as it was constructed by a famine work. It is almost impossible, however, to induce natives to accept this system in other streams, and at present it is impossible to compel them." Is that your own experience?—It is very difficult to carry that out in other streams. The cost of making a *bund* across a big stream would mean a great deal of money.

39. Q. Would the agriculturists make a great row if interfered with?—I think they would do what they were told. I think the Collector's order would be quite sufficient.

40. Q. Mr. Kilby goes on to say that the only way to compel the people is to bring these systems under the Irrigation Act to dispose of disputes summarily. Do you think there is any necessity for that?—It would probably make it more easy.

41. Q. Would it be popular?—Yes, I think it would be popular, because villagers are continually asking the Collector and other officers to assist them by making the different villages who want the water combine. They never combine on their own initiative.

42. Q. Is it not probable that some of the more powerful people get far more water than they are entitled to, and that they would bitterly resent anything of that kind?—I think so.

43. Q. They would be opposed to any reform of this sort?—No, I don't think they would do that, because they would be served so much better. I don't think they would object to it.

44. Q. The money that you receive from this cess, which you say is so many annas on the *bigha*, is it put into one common purse?—It is held by the Collector and drawn on by me as I require it.

45. Q. There may be this feature that a man upon one canal may be paying a cess, while for that particular year he will not get the benefit of it?—I think they all get the benefit during the year they pay for it.

46. Q. Supposing it was determined to introduce masonry head-works into these *pains*, would a man on A. Canal be willing to pay a cess to build one for the benefit of a man, or B. Canal knowing he would get no benefit?—The first work required would be at the head of the canals and that would serve everybody.

47. Q. Is there enough common spirit among them to make them agree to pay a certain cess, year by year, knowing that during certain years they would not get any advantage?—They would get some advantage from it, and I don't think there would be any difficulty in that. Of course that would be one of the things that might crop up, and by bringing it under the Irrigation Act, you would do away with any difficulty.

48. Q. I notice that south of the Sikrana, at any rate in the Saran District, there is a great deal of well irrigation and very little in Champaran. Why is that?—The people in Saran make very much more use of the limited amount of water that there is than they do in Champaran. That is practically because there is a thicker population there.

49. Q. In Champaran, according to this statement, there are only 1,413 acres under well irrigation, whereas in Saran it is 141,586 acres?—Yes.

50. Q. What is the reason of that great difference?—The sparsity of the population has something to do with it. In Champaran there is very much more land than they can cultivate, and the population not being large, they have not got the labour to do it.

51. Q. Have you any other suggestions you would make as regards the protective works to avert famine?—There are several, but no schemes have been brought up sufficiently. Generally speaking, I would make more use of the hill streams. (Witness pointed out several rivers on a map and described what could be done in connection with them.)

52. Q. In the Preliminary Reports on three schemes for irrigation in the Champaran District you say—"I think all three of the schemes will be most valuable to the country served, not only in dry years, but also in ordinary years." In dry years would these streams have water in them?—There is a certain amount of water in them.

53. Q. During the dry year of 1896-97 was there a certain supply coming down?—There was. The Pandai did a good deal of irrigation in that year.

54. Q. Do you keep up a list of famine relief works?—This is the list (hands it in).

55. Q. They are almost all roads?—Mostly roads and tanks.

56. Q. Are the tanks under you?—Yes, they would be, I think.

57. Q. As a matter of fact, there are a number of tanks here?—Yes, there are a great number in the district.

58. Q. Are these tanks excavated or made by bunding up the valley?—There are no valleys in the district that would be suitable.

59. Q. Are there any excavated tanks really large enough to irrigate any area worth speaking of?—They irrigate a few *bighas* round the tank, but there are very few of them large enough to irrigate any extent of country. There are

some tanks one thousand feet long and three or four hundred feet wide.

60. Q. How deep?—That depends upon the rainfall. There are generally six or eight feet of water in them. Those of course are exceptional. There are numbers which would be three or four hundred feet square.

61. Q. Such as they are, are they worth having for the sake of the irrigation they do?—There is always a certain amount of irrigation done round them, but they are principally used for cattle watering.

62. Q. (Sir Thomas Higham.)—Last famine there were a great many tanks dug in this district?—Yes.

63. Q. Are you in charge of many tanks?—Only on the Tribeni. In 1896 I had to do with some tanks, but after the first two months I was sent up to Ramnuggur on the Tribeni Canal and I had nothing to do with them.

64. Q. Have those tanks been any good?—They have been very useful.

65. Q. Do they hold water?—Yes.

66. Q. Generally for cattle watering?—A small amount of irrigation is done from them in addition to cattle watering.

67. Q. In regard to the Masan *pain*, you say you recover every year from the people the cost of all repairs?—Yes. They have got to pay up before the work takes place. They have got to pay at the beginning of the year for the work of that year, and if there is any surplus, it is carried on to the next year and the cess would be reduced.

68. Q. You make an estimate every year?—Yes.

69. Q. Do you charge them anything for establishment?—They have to pay for a munshi and two or three peons. They do not pay anything towards my salary.

70. Q. And they do not pay anything beyond actual cost of repairs. They do not pay interest?—No, none. They could not pay interest: it is their own money.

71. Q. What is the area that they irrigate?—It is about 60 square miles altogether, I should think.

72. Q. Sixty square miles is commanded by the *pain*?—Yes.

73. Q. How many acres? You say that 5,390 acres are irrigated by the Government works?—I am not sure whether the Masan *pain* has been entered in this or not.

74. Q. What are the Government works?—The Ecdari or the Madhubund Canal.

75. Q. Have you any idea what the Masan irrigates?—I am afraid I have not brought any figures down with me, but I could get them and send them to you.

76. Q. What does it run to. I want an idea of the size. Does it irrigate two thousand, five thousand, or ten thousand acres?—I should think ten thousand at least. The project, of course, has been improved and the irrigated area will be increased.

77. Q. What do they pay for annual maintenance?—It was six annas last year; three annas this year. That is per *bigha*, or two acres. Three annas is about the average.

78. Q. What do you strike that on; on the area irrigated in the previous year?—Yes. We have got to find out first of all if the people will take the water, and then, if the whole of the people who can get water could take it, the area they will get irrigated is estimated and it is struck on that.

79. Q. You strike it on the area you think they will irrigate?—Yes.

80. Q. Do they put in applications?—It is something to that effect. We send round to them and ask them if they wish to take water, and then if they say "yes" we send them the amounts they have to pay.

81. Q. And if they say they do not want it?—We do not give them any water if we can help it.

82. Q. (The President.)—Can you prevent them getting water?—Not in all cases, because the *pains* are not sufficiently well carried out to be able to prevent water going everywhere.

83. Q. Have you any legal power to stop them?—I prosecuted a man this year for stopping water and taking it into his field before he had paid for it, and he was fined.

84. Q. (Sir Thomas Higham.)—Do the areas they say that they are willing to take water for vary much from year to year?—They do sometimes.

85. Q. When they send in their applications they do not know what the year is going to turn out like?—No.

86. Q. Suppose a man does not want to take water first and wants to take it afterwards, what happens?—If he paid his whole assessment, we would allow him to do that.

87. Q. You would not charge him anything extra?—I did charge a man extra once. That was the same case where he was fined in the Court. I charged him double. But after all double does not come to very much.

88. Q. I suppose you do all that on your own authority?—The Collector very often looks into these things.

89. Q. It is done by your personal influence. You have no particular *locus standi* in that matter?—I have no legal authority of course.

90. Q. You have no measurement of the areas at the end of the season?—No. We take the areas from the *jama-bundis*.

91. You say you work the lengths by rotation. Do you close them?—Yes.

92. Q. You do not leave it to the people?—No.

93. Q. That is all charged for in the cess?—Yes.

94. Q. Has the Board anything to do with the matter?—Nothing at all.

95. Q. They do not advance any money for it?—No.

96. Q. But you are the District Board Engineer; are you not? How did you come to have anything to do with it?—The Chairman of the District Board asked me to take it up.

97. Q. You say where there are a number of these *pains* the people are always coming to the Collector and making complaints against each other. Do you think they would like Government taking the management of the distribution into their hands?—I fancy in a great many cases they would.

98. Q. You think it would be popular?—Yes.

99. Q. Is there much damage from floods?—Floods do very little damage. There is a considerable fall in the country, so that the floods run off very quickly. I have seen very little damage done by floods.

100. Q. There is no water-logging?—No.

101. Q. Do they run the water off during floods?—It runs from field to field until it gets into the drains.

102. Q. (Mr. Rajaratna Mudaliar.)—Apparently the cess you talk about is not levied under any enactment. It is a sort of mutual arrangement between the canal officers and the tenants who irrigate the lands?—It is a sort of arrangement between the Collector and the tenants.

103. Q. Is the cess levied on the area actually irrigated, or on the area of the village?—From the area it is possible to irrigate. Some years of course when there is a short rainfall, and we find there is not enough water to irrigate the whole plot, we levy the cess on the area commanded. The cess is used for managing the *pain*, and all that has to be paid for, so that we could not give it back even in a year when there would have been no water.

104. Q. This cess is in addition to the water rate?—There is no water rate. They pay nothing else.

105. Q. And the *pains* belong to Government?—The *pains* were originally made during the famine of 1897 as a famine work. There are a great many other *pains*, however, with which we have nothing to do. They are entirely carried on by the zamindars.

106. Q. So you do not levy any water rate at all?—No.

107. Q. The cess is practically a water rate?—The cess is simply for keeping the *pains* in order.

108. Q. Is there any objection to abolishing the cess and substituting a water rate?—I think there would be a great deal of difficulty in doing that. We would want a large establishment for that. The people at present are paying as lightly as can be done.

109. Q. (The President.)—You estimate the cess?—The Collector keeps the money and I indent upon him as it is required.

110. Q. Do you think that the zamindars would be willing to construct new *pains* if professional advice were given them as to sites and other things?—Well, it depends whether they are well enough off to carry on the work.

111. Q. Could they not borrow from Government?—I have no doubt they would do a good deal in that way if they could get the money from Government, and if further facilities were given to them for acquiring lands.

112. Q. The evidence we had at Bankipore was to the effect that there was great reluctance on the part of

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Mr. E. T. zamindars and tenants to take loans from Government?—I do not know enough about that to be able to give valuable information on that point.

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113. Q. (Sir Thomas Higham).—Do you know what was spent on the Masan *pain*?—It came to, about Rs. 2,000; it might have been a little more. Its upkeep costs from Rs. 1,000 to Rs. 2,000 a year.

WITNESS No. 20.—Mr. A. DUNSFORD, Moorla Estate, Champaran.

Mr. A. Dunsford.

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1. Q. (The President).—I understand you are Assistant to the Manager of the Ramgurwa Concern?—Yes.

2. Q. Have you had long experience of this part of the world?—No. I have only been here about four years.

3. Q. You were not here in the last year of serious drought in 1896-97?—No. I was not in the Concern then. That was before I came.

4. Q. Where is the estate that you are employed in?—It is in the Motihari District.

5. Q. What do you grow there?—Rice and different kinds of pulses. It is a rice country mainly.

6. Q. Have you, from the time you have been there, been in want of irrigation?—No; we have been in no want. We have banded the rivers ourselves.

7. Q. And this banding of the rivers do you find it causes disputes with other zamindars?—We have no other zamindars around there. We have it all our own way there.

8. Q. Have you any trouble with the Nepalese bunding the rivers?—None whatever. The Nepalese cannot bund the Tilawe river: they bund other rivers.

9. Q. Are there any measures that you would advise or works that could be carried out which would improve the situation?—Mr. Harman has advised me to ask Government to grant us small loans for the purpose of making *pains* for taking water where it will not reach by bunding the river.

10. Q. And do you propose to make an application?—Yes.

11. Q. Have you ever done so hitherto?—Not yet.

12. Q. Is it done by others?—I don't know round that way at all. There is only one other factory near us.

13. Q. Roughly speaking, about what amount of loan would you wish to have?—About Rs. 8,000.

14. Q. Is that an indigo country at all?—There was indigo there up to four years ago. There has been indigo there during the last 20 years until four years ago.

15. Q. How long does the water in the Tilawe last; all the year round?—Yes. It is a good river.

16. Q. There has been a proposal for making an irrigation canal from that river. The Concern you are in; has it got a large area of lands?—We have got about 36,000 acres.

17. Q. I see the project here was to supply water estimated at 200 acres which would give 16,000 acres of *kharif* and 5,000 acres of *rabi* irrigation. Would that be all in your zamindari?—I cannot possibly say whether that would be only in our zamindari.

18. Q. Would you be bettered in your country by having a canal laid down there on scientific lines?—I don't think we would want a canal there, but only these *pains*.

19. Q. Of course, if there were a proper canal laid out professionally, it would cost money and there would be a water rate imposed?—It would entail water rates on the rice. There would be some difficulty about that. The *rayats* would make objections to that.

20. Q. You think things are very well as they are?—Yes. All that really is required are just these *pains*.

21. Q. We have had evidence of its being desirable to have masonry sluices at the head of the *pains*. Do you think that is desirable?—I don't think so. I think just the *pains* only would do.

22. Q. Have you ever had any trouble with the *pains* being silted up just at the time when water is wanted?—No.

23. Q. You keep them clean yourself?—Yes.

24. Q. (Mr. Rajaratna Mudaliar).—We were told yesterday that in one place a *pain*, which was about 10 to 15 feet wide at the mouth, became enlarged owing to floods to 100 or 150 feet. In such cases don't you think that masonry head-works would be of use in regulating the flow of water?—I cannot give you any information on that

point. This is not likely to happen with us: the bund we make; the river would carry away before any more damage was done.

25. Q. In your *pains* don't floods occasionally pass down?—Occasionally. Our rivers spill over more or less nearly every year.

26. Q. And cause damage?—We get no damage from floods around these. Damage is done more or less when the flood-water does not recede soon. The paddy submerged will not be damaged under 48 hours: it is not often it lasts longer.

27. Q. So that, so far as the estate in which you are employed is concerned, there is no necessity for any masonry works?—None whatever.

28. Q. It was suggested by Mr. Oldham that legislation would be desirable to enforce upon the zamindars the duty of keeping the *pains* in order; do you think such legislation necessary?—No, I don't think so. The zamindar himself sees that the *pains* are kept in order. There is no necessity for legislation in our part of the district.

29. Q. But, speaking generally as regards zamindars, Mr. Oldham's experience is that *pains* are very seriously neglected as also the *ahars*, and that legislation is very essential. What is your view?—Well, of course, judging from one part of the district, I don't consider it is necessary, but I cannot speak as to other zamindars.

30. Q. Supposing they were neglected, don't you think the Collector should have the power to interfere and compel zamindars to execute the necessary repairs?—I cannot give an opinion on that point.

31. Q. As regards the enhancement of rent, is there any difficulty in enforcing a claim on the part of a zamindar where he constructs works at his own cost?—I don't quite understand the question.

32. Q. Supposing a new *pain* were constructed by a landlord, can he enhance his rent?—No, he cannot enhance his rent.

33. Q. There is a provision of the Bengal Tenancy Act which gives him power to enhance rents where he has constructed irrigation works at his own expense?—I don't know. I cannot tell you that. When it is necessary to bund up the river for irrigation, the *rayats* practically do it; thousands of men turn out and help themselves and we supervise.

34. Q. In your estate, if you construct a new *pain*, you don't enhance the rent?—No, we don't.

35. Q. Is the sharing (*bhaoli*) system in force in your zamindari?—We have both the *bhaoli* and *nakdi*.

36. Q. In the *bhaoli* system you get an enhanced share of the produce on land converted from unirrigated to irrigated. In the *nakdi* system, suppose you construct a *pain* and give irrigation to the tenant, don't you levy an enhanced cash payment?—There is no actual increase in the rent. He would have to pay for the labour employed, but that would not affect his *jamabandi*. I don't think we have the power to increase that.

37. Q. If Government constructs a canal and supplies water to the zamindari, would the zamindar be willing to pay a water rate for the irrigation supplied?—In one instance I don't think so. We don't want a canal, and there would be no objection in irrigating the zamindari.

38. Q. Is there any portion of the zamindari which can be irrigated by any scheme which is now in contemplation?—I don't know whether there is any in the zamindari in our immediate neighbourhood. We only want a small loan for *pains*; otherwise everything is satisfactory.

39. Q. Do you think the rate of interest now charged on loans and the time allowed for repayment might be made more liberal?—I don't know the terms.

40. Q. 6½ per cent. is the rate of interest and a maximum period of 20 years for repayment?—I cannot give any opinion on until I have taken the advice of the manager. I am only here in his place. The manager considers 6½ per cent. reasonable and 20 years generous.

WITNESS No. 21.—MR. T. BARCLAY, Zamindar, Champaran.

With the permission of the President witness made the following statement:—

"I should advocate the extension of the Tribeni Canal across the Sakrana river into a *bhangar* soil tract of 150 square miles; there is insufficient rainfall there and the crops often fail."

1. Q. (*The President*).—Have you consulted the Superintending or Chief Engineer about this?—My brother, who used to be Manager, has been in correspondence with the Collector about it. My brother is in England on leave; he and I are partners.

2. Q. A note will be taken of your wish. Have you had long experience of this part of the world?—30 years.

3. Q. As regards the *pain* irrigation, does it work smoothly?—We have had no experience of *pain* irrigation.

4. Q. Are your lands not irrigated at all?—No. We have done a little with pumps in years when there has been a small rainfall.

5. Q. If the Tribeni Canal were extended as you propose, would the agriculturists take water every year, or merely in one year out of five?—In some villages they will take it every year. This particular land being *bhangar*, the greater part of the land would be irrigated every year.

6. Q. As a matter of fact, up to now cultivation has been carried on merely by rainfall?—Yes, and wells; a very small amount by wells.

7. Q. Is well irrigation popular among the people? Do they use it for rice?—No, it is used chiefly for opium and some other crops.

8. Q. Did the cultivators apply for advances from Government at all for sinking wells?—They applied to the Opium Department; it is a great opium district.

9. Q. Have you known much of the disputes as regards taking water from *pains*?—I have had no experience of these *pains* at all.

10. Q. Are there any *ahars* in this country?—No.

11. Q. (*Sir Thomas Higham*).—In this tract of 150 square miles that you spoke of do they grow rice now?—Yes, in the low-lying lands—*chaurs*.

12. Q. It depends entirely on the rainfall?—Yes.

13. Q. Have you any idea of the rate the people would be willing to pay for water for their rice?—No, I could not

say. But I think Rs. 2 to Rs. 2-8 per acre for land irrigated would be paid gladly.

14. Q. Have you any irrigation at all on your own estate?—None, except what we do by engines in a bad year.

15. Q. Is that done very largely?—Last year I irrigated over 300 acres of land.

16. Q. Do you pump up water for your tenants?—No.

17. Q. (*Mr. Muir-Mackenzie*).—Are you quite confident of the soil of the Sakrana being suitable for irrigation?—As far as my knowledge goes it is the same soil as the Tribeni Canal is made to irrigate.

18. Q. Is the soil south of the Sakrana similar to the soil of the Saran District?—I don't know. I don't think it is.

19. Q. You don't think there is room for any considerable extension of well irrigation?—It might be done if this scheme is not practicable. If *pains* were made from the Sakrana, they would have to raise the level as is done in the Gya District; there is the river which, four to five miles with buttresses, keeps the water up over the level of the country. No doubt that would be expensive.

20. Q. With regard to wells, can you say whether the number of wells has been greatly increased, in any part of the district which you know, by the Opium Department?—The advances given by the Opium Department are not popular.

21. Q. Is there any reason for the unpopularity?—A native gets a couple of hundred rupees and wants to spend it elsewhere, or if he spends it on a well, he objected to repay it again, and I doubt if he gets long enough time in which he can repay it.

22. Q. I have read an interesting paper by Mr. Tytler, who was formerly in the Opium Department, showing how he was able to get over 3,000 *pakka* masonry wells made in Saran. I should like to get your opinion as to whether it would be possible to overcome the prejudice?—It is difficult to say, but it might be done with a good officer who had his heart in his work.

23. Q. You don't think there is anything in the soil or want of manure, or any other condition that would add to the difficulties of the person who tried it?—No.

24. Q. The soil is fit for irrigation?—Yes.

25. Q. And water is not too far below the surface?—No; only 15 to 20 feet in years with good rainfall and at the first time of the year.

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WITNESS No. 22.—MR. R. G. KILBY, Officiating Collector, Champaran.

(Replies to printed questions.)

The chief obstacle to private irrigation is the want of control over the distribution of water.

Most of the hill streams north of the Sakrana are utilized for irrigation purposes, and each of these throughout their courses have connected with them a series of *pains* to carry off the water to neighbouring villages.

The water is obtained by damming the bed of the river.

These dams are swept away by the rains and have to be renewed.

The making of these dams is generally deferred until the last moment, in the hope that rain will fall and avert the necessity for making them.

When a serious break in the rain occurs, and irrigation becomes necessary to save the crops, bunds are at once constructed.

These streams carry an extremely limited supply of water.

The channels made to carry off the water for irrigation are extremely defective; in fact, sometimes water is allowed to flow off through natural depressions where there is no defined channel. The result is that a great deal of water is wasted. Those persons who have bunds high up the stream get practically all the water, while those lower down get very little.

When a serious break in the rains occurs, there are frequent complaints made to the Magistrate that such and such a person has made a new bund, or has made a bund at a place where it had never been made before, and requesting that it may be out. Local enquiries in such cases are Ben.

necessary. The Magistrate cannot always get out at once to enquire. Frequently complaints of this sort come simultaneously from different places.

Delay inevitably follows with often disastrous results.

The jurisdiction of the Magistrate in such cases is extremely limited. He can only intervene to avert a breach of the peace, and his decision must be based on the ground of immediate possession.

He has not got the legal powers to settle these disputes satisfactorily.

When it is found that any one person is appropriating to his own use the whole of the water of any particular stream, the order that is generally passed is that he must make a *jhanj* and allow half the water to pass on. This is unsatisfactory, as obviously those who have bunds high up the stream get a great deal more water than those below. A *jhanj* can be easily tampered with. Anyone can stop it at night with a few basketfuls of earth. Detection in such cases is very difficult, and it is situated in the locality of people who wish to stop it and far from those persons living lower down the stream who wish it to remain open.

The *jhanj* system is in every way unsatisfactory. A better system is of fixing dates on which villages along the course of any stream shall be allowed to take water from it. This is done in the case of Mannan *pain* which is under the control of the Executive Engineer. Government has a right to the control of the water of this *pain* as it was constructed as a famine work. It is almost impossible, however, to induce natives to accept this system in other streams, and at present it is impossible to compel them.

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The only way to do this would be to bring these streams under the Irrigation Act. They would then be placed under the control of an officer legally competent to arrange for the distribution of water and to dispose of disputes summarily.

This officer would be an irrigation expert, and would be able to point out defects in existing irrigation works and to suggest remedies. He would be able also to prevent the construction of new irrigation channels on unscientific principles.

He would presumably be an irrigation officer connected with the Tribeni and Dhaka Canals and would be able to see that new private irrigation works, or extensions of private irrigation works were made on lines compatible with the construction or future development of Government Irrigation Works.

What then is required is that as many of the streams now used for irrigation should be brought under the Irrigation Act as is possible. That these should be placed under the control of a European Engineer connected with the Tribeni and Dhaka Canals and residing for the greater part of the year in the locality.

In order to assist the extension of private irrigation works, it is desirable that Government should be willing to lend skilled surveyors and scientific instruments to persons wishing to make private irrigation works at a reasonable charge.

To assist private persons in the construction of approved irrigation works by lending money at low interest.

1. Q. (The President.)—You are Officiating Collector of this district?—Yes.

2. Q. Have you been long connected with this district?—I have been in the Bettiah Sub-division for some time.

3. Q. I gather from what you say in your note that there is no irrigation in Champaran south of the Sakrana?—No.

4. Q. They look with suspicion upon it?—River irrigation would be acceptable if it were possible; well irrigation is not acceptable; there is a prejudice against wells in the native mind; they say it alters the texture of the soil.

5. Q. In a paper by Mr. Tytler I have seen it said that private people look upon river water as being cold and having no fertilising power; they prefer a *jhil* or well?—I don't know.

6. Q. I suppose you have not been here during any time of drought or distress?—No.

7. Q. You say in your note "there was famine in Champaran in 1866, 1873-74 and 1896-97"; have you any statistics about the total number on relief works?—There are statistics, but I don't happen to have them.

8. Q. I wanted them rather as a gauge of the severity of famine. Are the people north of the Sakrana in the habit of irrigating from *pains* every year or merely in years of drought?—Every year there is a good deal of irrigation.

9. Q. You propose that the *pains* should be taken up and excavated and treated in a professional and scientific way?—I think so.

10. Q. Now would the people, who benefit from the *pains*, zamindars or rayats, be willing to pay, supposing Government were to depute an engineer to direct operations?—I think they would prefer to be allowed to do it themselves under advice. I don't think that where they have a *pain* from which they have been getting water for nothing that they would like Government to make a new *pain* and charge for the water.

11. Q. Of course you will see that one cannot have improvements without paying for them?—Yes.

12. Q. One of the first improvements would be to build sluices or some regulating works at the heads of the *pains*?—I think they would be too expensive. I did not contemplate that; I meant levels should be taken first.

13. Q. You have sent in a very interesting paper as regards legislation required for the regulation of *pains*. Would you bring the whole of the *pains* under the Irrigation Act?—I think I would bring as many as could be brought conveniently.

14. Q. That would be all the more important ones?—Yes, merely under the control of some one.

15. Q. Would the owners not resent it in some cases: men who had been doing exactly as they liked with their *pains* hitherto?—Yes, they might.

16. Q. You would give the Magistrate power to levy a cess for necessary works?—Very slight.

17. Q. I am afraid several of the difficulties you alluded to here, as regards breaching of dams, etc., could not be rectified without introducing masonry works, but you have not contemplated what you say?—No.

18. Q. (Sir Thomas Higham.)—You suggest that measures would be most useful in taking up land and excavating *pains*. Are there any tracts of that sort provided for in your famine relief programme?—I have been only a month in office and have not seen the programme.

19. Q. Is there a programme?—Yes. (Mr. Sealy explained that *pains* would be carried out as civil agency works.)

20. Q. You propose to bring all the systems in which there are *pains* under the Irrigation Act?—Yes.

21. Q. Is that possible? Could you bring them under the existing Act, or would you require a special Act?—Only so far as they were connected with one of the Government canals (Tribeni or Dhaka).

22. Q. Is money ever advanced for making *pains* or works of that sort?—No, I don't think so; not to my knowledge.

23. Q. Under the Land Improvement Act?—One could do it.

24. Q. They don't take advantage of it?—No, I don't think so.

25. Q. (Mr. Muir-Mackenzie.)—You have only been Acting Collector a very short time?—Yes.

26. Q. Where were you before that?—I was Sub-divisional Officer in Bettiah.

27. Q. Had you any power to give advances?—Yes, under the Collector.

28. Q. Were powers delegated to you?—Yes, only one year; I should have had to apply to the Collector.

29. Q. You did not apply?—No.

30. Q. Why?—It did not occur to me.

31. Q. The practice of giving advances has not been much developed in the district?—They were given generally when there was scarcity.

32. Q. But not in ordinary years?—No.

33. Q. What is the reason? Is it because the people would not take them?—Because they were not supposed to be required.

34. Q. The Land Improvement Act has been very little utilized?—I believe so.

35. Q. If money were given in large sums to competent people, do you think something could be done?—Yes.

36. Q. You think people would take the money?—Yes.

37. Q. Is there any chance of land-owners or cultivators combining to take considerable sums of money for the purpose?—It is very difficult to get them to combine.

38. Q. I am particularly struck with this paper of Mr. Tytler's. He says the way in which he got wells dug was by getting the smaller cultivators to combine. Would you despair of doing that here?—I cannot say really.

39. Q. Supposing you devoted your whole time to it and nothing else, could anything be done?—Yes, probably.

40. Q. Would the people spend the money properly?—I don't know.

41. Q. If you think it could not be spent properly, don't you hesitate to say so? Perhaps you feel that the thing is so new that you cannot say?—Yes.

42. Q. You mention as one of the obstacles to the extension of private irrigation works "the uncertainty as to whether the lease-holders will be allowed to hold the lands irrigated for a period sufficient to recoup them for the expenses incurred." What remedy would you suggest for that?—All the land belongs to the Bettiah Raj and the length of lease rests with them.

43. Q. Have these people not occupancy rights?—No, the people who make these things are tenants.

44. Q. And the period of their tenure is limited?—It is liable to renewal.

45. Q. Have you any suggestions in regard to the second obstacle—that of obtaining land for irrigation channels?—Unless Government can assist them with land, I don't see anything else.

46. Q. There is no difficulty in getting hold of the land?—Yes, there is that difficulty.

47. Q. Government has not any power under the existing Act to acquire the land?—Not unless it intends to make the canal itself.

48. Q. Should power be given to acquire land for private persons?—No.

49. Q. This difficulty is very hard to solve?—Yes.

50. Q. You say that "well irrigation is very little practised in this district." Is there any reason why it should not be practised?—There is a local prejudice.

51. Q. Is there anything in the prejudice?—It has not been tested to my knowledge.

52. Q. (Mr. Rajaratna Mudaliar.)—You said just now you did not think it was desirable to legislate for acquiring land in the case of proprietors who wish to construct irrigation works?—Yes.

53. Q. Why do you think it unnecessary?—If Government acquired land, it would have to make the channel itself, and having made the channel, it would require the persons who used it to pay for water.

54. Q. There are cases in which private persons are prevented from constructing *pains* owing to their inability to acquire land. Do you not think it would be advisable to legislate to enable Government to step in to acquire the land?—I don't think the matter is of sufficient importance to call for legislation.

55. Q. There may be a *pain* which, if constructed, might serve a dozen or more villages and a single man steps in and

causes obstruction; in such a case would you not legislate?—I think legislation would cause more harm than good.

56. Q. But the Collector would exercise his own good sense in the matter?—I think there would be difficulties.

57. Q. Mr. Sealy referred to a *pain* constructed as a famine relief work, under which there was a small cess levied for the repair of the *pain*; are you acquainted with that work?—No, I have never had anything to do with it.

58. Q. Do you think there is any objection to imposing a water-rate on lands irrigated by that *pain*?—I don't see the necessity for it. I know nothing of the way in which it is worked.

59. Q. Government has spent a large sum of money in constructing it; why should it not recoup itself for the outlay by levying a water-rate?—It was made for the good of the country.

60. Q. Is there any reason to forego a water-rate and charge only three annas a *bigha*?—I don't know that there is any special reason.

61. Q. He said some *rayats* were prosecuted who took water without paying the cess; do you know if they were prosecuted under any special law or under the Indian Penal Code?—Under the Indian Penal Code as far as I remember.

62. Q. Are there any cases within your knowledge in which loans were granted for the construction of wells?—I know they have been; they were not advanced by me.

63. Q. Does the law in these provinces allow Collectors to grant remissions in cases in which there has been failure of wells? Do you remit a loan when a well fails?—No; such case has never arisen.

64. Q. Does the law contain provision to that effect?—I don't know; no remission has never been claimed.

[Mr. Allen replying to Mr. Rajaratna Mudaliar. The Collector would no doubt recommend a remission. I don't remember any distinct provision in the law.]

Mr. R. G. Kibby.

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WITNESS No. 23.—MR. C. STILL, Manager, Bettiah Raj.

1. Q. (The President.)—You are Manager of the Bettiah Raj?—Yes.

2. Q. Have you had long acquaintance with this part of the country?—Twenty-four years.

3. Q. Have you seen anything of famine?—One great famine—the 1896-1897 famine—was heavy in our part of the world.

4. Q. Do you think the country is better off now than it was in 1896? Is there any change in the circumstances?—No. I think not.

5. Q. Is there anything you would recommend in the way of rendering the tract secure against famine?—I think a great undertaking is the Tribeni Canal; outside that tract there would not be much; most of the *pains* would be taken in in connection with that scheme. I think there would only be four miles more that remains to be talked about in the Mnsan *pain* for instance.

6. Q. Do you think it is certain that the agricultural classes will take water every year?—Yes.

7. Q. And that they will not merely wait for a year of drought?—I think after one year of drought they will certainly take it up.

8. Q. Do you approve of this idea that has been spoken of of taking the Tribeni across the Sakrana?—I don't know if there are any engineering difficulties. There is a tract which, if it could be irrigated, would be the better.

9. Q. (Mr. Muir-Mackenzie.)—The soil south of the Sakrana is not fit for irrigation?—There is a tract which would benefit, but all would not.

10. Q. (The President.)—It is good enough for cultivation?—Yes.

11. Q. It has dry soil?—Yes, I doubt if it would hold moisture; you would always have to irrigate.

12. Q. You have had a good deal to do with *pains*?—Yes, in my connection with Sati Factory.

13. Q. Do you consider that the irrigation carried on by these *pains* is in a satisfactory condition, or could anything be done to improve them?—I think that I would leave that to private enterprise, assisted by Government. There might be an enquiry as to the condition of these *pains*, and where it was found necessary to take them over by Government, that should be done, and let the Tribeni Canal take over the balance.

14. Q. Where they are not working satisfactorily?—There are places where there would be disputes between the different people; in these circumstances I would give the Collector a little more power to settle the matter; but would not allow any further interference with them.

15. Q. If there was a real improvement to be introduced into a *pain*, it would of course cost money; would the *zamindars* or *rayats* resent a cess being laid on their lands on this account?—I think the people who had been enjoying the proceeds of their own labour for the past 20 years would resent it. They would pay for extra improvements.

16. Q. Supposing it was a sluice at the head or a regulating weir?—Weirs are very expensive and could not be very well introduced; simply putting in head-works would not help much except to catch a little silt.

17. Q. Is the Tribeni looked upon as a great boon?—Yes, I think so; the people understand irrigation and have done as much as they possibly can and wherever they can.

18. Q. (Sir Thomas Higham.)—You think the best thing would be to help the owners of *pains* with advice?—Yes, after due enquiry. In certain cases where disputes arise perhaps it would be better for Government to take them over.

19. Q. Would the proprietors not welcome that?—It is not necessary in our part of the world; when the Tribeni Canal is completed it will take over the greater part of Champaran; that is suitable for irrigation.

20. Q. Would they take advances?—I think they would for improvements.

21. Q. There are many on the same stream. Could there not be an amalgamation at the lower end?—I think that might be done in certain cases.

22. Q. Would the people be willing to work it up and carry it out?—I don't think I should put much faith in the people. I should leave the *tikadars* to deal with the people themselves.

23. Q. Would the principal people, do you think, combine to carry out any rational work?—Yes.

24. Q. Is it only want of money that would prevent them, or are there jealousies?—In Champaran there is one landlord and that facilitates matters very much; that is the Bettiah Raj; there is no object in acquiring land; there the Raj would only too gladly give land free for the

Mr. C. Still.

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improvement of the estate. In other estates I cannot say whether the owners are sufficiently interested. The Ramnugger Raj to the north will to a great extent be taken in by the Tribeni Canal. Any hill streams to the north of the Tribeni Canal might be enquired into as to whether worth developing for irrigation or not.

25. Q. Do you spend a large sum on improvements?—No.

26. Q. Not as much as there might be?—As much as we could afford perhaps.

27. Q. Would you advocate that extension south of the Sakrana?—Yes, provided there are no engineering difficulties.

28. Q. You would have to cross the river?—Yes.

29. Q. Would not that be very costly?—Yes.

30. Q. And it is a question whether you could get sufficient water?—Yes, that is the great question; that particular tract of country is the same as at the north, i.e., clay soil.

31. Q. Can you say anything of these other projects to the west, the Tilari and Passai?—No, I don't know the country very well.

32. Q. Do you know the extent to which the Nepalese interferes with the streams?—The hill streams we have to deal with don't come from Nepal; the water-shed is on our side.

33. Q. (Mr. Muir-Mackenzie).—Have you any suggestions at all to make to the Commission?—No.

34. Q. (Mr. Rajaratna Mudaliar).—If more funds were available, more might be done in improving irrigation in the zamindari?—Yes.

35. Q. Why don't proprietors take loans from Government?—I fancy it would be better to deal with our *tikadars*; they are responsible gentlemen as a rule.

36. Q. They might apply to Government?—Yes.

37. Q. Do you think the terms on which loans are offered are sufficiently liberal: 6½ per cent. for 20 years?—I think so; decidedly liberal.

38. Q. You don't think a reduction in the rate of interest or extension of period is necessary?—No.

39. Q. Still very few proprietors take loans from Government; what is that due to?—I don't know.

40. Q. Is the *bhaoli* system maintained in your zamindari?—No, the *nakdi*.

41. Q. Has the zamindar power to enhance the rent where they construct irrigation works?—They have the right to enhance rents if they construct works at their own cost; but it is not done.

42. Q. Have any irrigation works been constructed in the past 20 years in the zamindari?—Yes.

43. Q. Have new works been constructed?—There is nothing very much. Mr. Moore and Mr. Brooke made *pains* and of course Mr. Coffin.

44. Q. There was no enhancement of rent?—No.

45. Q. Is that due to any difficulty in the way of enhancement or to generosity on the part of the proprietor?—They take their return in that they secure the crops.

46. Q. Supposing the Tribeni Canal were extended to the zamindari, would the people be willing to pay water-rates?—Yes, after they had had sufficient experience of the value.

47. Q. (Mr. Muir-Mackenzie).—You are of opinion that when the Tribeni Canal is made the district will be sufficiently protected from famine?—It would certainly protect the whole of the north of the district which is the part that suffers.

48. Q. Do you think it would be protected so far that relief would be unnecessary?—I think so.

49. Q. (Mr. Allen).—Why is well water unpopular in Saran?—South of the Sakrana they object to them.

50. Q. Have you made enquiries as to the cause?—I have made hundreds of wells at different times in the famine year. I experimented and found them very unsatisfactory. The amount they do for you is nothing. The Opium Department is particularly interested in this. Immediately round villages villagers can irrigate their opium and their rice seed, which is very important. Where land is suitable, wells do for opium, as opium only requires surface irrigation and for rice seed for same seasons and that the required land is very small in area.

51. Q. Have you heard anything about the use of well water in Champaran?—High lands don't take water as well as in the low lands as salts form. In the north of the Sakrana there would be no difficulty so far as salts go.

52. Q. You have known that yourself?—Yes, in Saran too.

WITNESS No. 21.—MR. S. E. COFFIN, Zamindar, Sati-Bettiah, Champaran.

Mr. S. E.
Coffin.
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1. Q. (The President).—Have you long acquaintance with this district?—Yes.

2. Q. Have you seen famine in it?—Yes.

3. Q. Were you here in 1873-74?—I was not in Champaran.

4. Q. What measures would you recommend for rendering the district more secure from famine in the event of another failure of the rains?—North of the Sakrana the Tribeni Canal would do all that is required.

5. Q. Is there water enough in it for the whole district?—I understand there is.

6. Q. Is there water enough in the Tribeni Canal for all the land could be commanded?

(Mr. Horn).—There are 2,170 cubic feet.

7. Q. Is that all that is likely to be required to meet the wants of the place?

(Mr. Horn).—I think so.

8. Q. I mean if there was twice as much water would the canal be made twice as large?

(Mr. Horn).—We have not contemplated these extensions that are proposed.

9. Q. You have, I suppose, largely used *pains*?—Yes.

10. Q. And do the people use them in years of drought?—Yes, every year.

11. Q. From what you know of the country would it be desirable, do you think, to take these canals further than at present?—I certainly think it would if there is enough water.

12. Q. Do you find things work fairly smoothly as regards irrigation from the *pains*?—Yes; I have had some disputes.

13. Q. Are the rights of the different villages fully recognized as regards the amount of water they take? I

presume the people at the top of the river can turn off the supply from those lower down?—I have entire control and don't allow it.

14. Q. And as regards others, what have you found?—In the case of villages where there are different *tikadars* there are disputes; very often they allow the water to go waste rather than let it go down.

15. Q. Would the situation be improved and the water be better utilized if there were legislation?—As far as I know where this Tribeni Canal is there will be no necessity for these small *pains* to the north of it.

16. Q. But you must come to the end of the Tribeni; how about the east? The Tribeni will be exhausted before you get to the end of Champaran?—I cannot speak of that part of the country; I am only talking of the part that the Tribeni flows through.

17. Q. What is your opinion about well irrigation? Has it any place in agriculture?—There is hardly any well irrigation.

18. Q. Have you any practical knowledge of the land south of the Sakrana?—No.

19. Q. The land north is all rice land?—Mostly.

20. Q. Do you think that that district at least will be pretty safe once the Tribeni is in working order?—I think so.

21. Q. (Sir Thomas Higham).—You have a good many *pains* over your estate?—Yes, about 50 miles of *pains*.

22. Q. How many separate *pains*?—There are two main *pains*—one from the Pantai and the other from Maniari; the others are off-shoots.

23. Q. Do you require bunds at the heads of these?—I have to bund the river, in the first instance, to get water I again bund up the *pains* to raise the level of the water to flood the land I want to irrigate.

21. Q. I suppose the bunds you put in the river get washed away?—Yes; it is very difficult to keep them in the rains, unless it is a very dry year.

25. Q. What is the depth of the river?—The Pantai is 150 feet.

26. Q. Have you ever raised the question of putting up a permanent bund?—Yes.

27. Q. There are no falling shutters?—No; it was thought too expensive; a *kachcha* bund costs very little, so it does not much matter even if it is washed away.

28. Q. What is the area you irrigate from these *pains*?—In a famine year I irrigate about 12,000 acres.

29. Q. And in an ordinary year?—Anything between 4,000 or 5,000 acres.

30. Q. I suppose the amount they will irrigate from the Tribeni Canal will not be more than $\frac{1}{2}$ of what they will irrigate in a famine year?—In time they will take water every year.

31. Q. Do you make bunds every year?—I don't trouble about bunds in an ordinary year.

32. Q. You only make bunds when there is great demand for water?—Yes, I give water for opium and *rabi* every year.

33. Q. Do you give them water for rice?—Yes.

34. Q. In ordinary years?—Yes; sometimes the bund stands.

35. Q. When does the bund break?—It depends on the rain in the hills: sometimes on the 1st of July, sometimes in June.

36. Q. They only get water for seedlings?—Yes, they put down seedlings early.

37. Q. Are they all your tenants?—Mostly.

38. Q. Do you charge them anything for it?—No, I give it free.

39. Q. You get benefit from the produce?—If they get a good crop, it enables me to get the rents in.

40. Q. Do you take your rents in a share of the crop?—No, in cash. I irrigate all my indigo and other crops.

41. Q. When do you want water for indigo?—I don't sow till the end of February.

42. Q. Do outsiders pay for the water you give them?—No.

43. Q. Have you any idea what they would be willing to pay for it?—I think they would pay me Rs. 2 to Rs. 3 an acre. In a dry year they would pay me anything for it.

44. Q. In an ordinary year what is the difference between an irrigated and unirrigated crop of rice?—It would make a difference of 25 per cent. in the value of the crop; in the case of *rabi* it doubles the value.

45. Q. How many waterings are required in the *rabi*?—Two to three.

46. Q. (Mr. Rajaratna Mudaliar.)—As regards the protection of these bunds, who arranges it, is it arranged by the zamindars?—Yes, with the help of the rayats; the day the river is to be banded up they come in and give one day's help.

47. Q. What area is irrigated under these *pains*?—About 20 to 25 square miles.

48. Q. (Mr. Muir-Mackenzie.)—Would you be willing to take advances from Government? Would they help you?—I could not do anything more than I have done. I have got all my *pains* made.

WITNESS No. 25.—MR. E. F. Growse, Officiating Additional Commissioner of Patna, late Collector of Saran.

Note on Irrigation in Saran.

1. I beg to submit for the Commission's consideration a letter from Mr. Graham, the Officiating Collector of Saran, to the address of the Commissioner, and dated 21st instant, which puts the case from the local point of view.

I would wish however to add the following remarks:—

2. The Saran Canals are not and can never be made a productive work. The conditions of rainfall and of the district generally prevent this. But they should be regarded as a protective work in years of scanty rainfall, and as a sanitary work also, and with this latter object in view, should be maintained open all the year round, in all years.

3. They should be, if possible, improved. It appears from Mr. Horn's note that the initial difficulty is the uncertainty of the supply of water in the *sotas* or by-channels of the Gandak from which the canals or rather cannalized rivers are fed. He also says that there is a great danger of these channels being left dry owing to changes in the course of the Gandak.

This is of course a question for the engineers; but it would seem that improvement of the source of supply is not impossible, and at any rate even under existing conditions at certain seasons of the year an almost unlimited supply of water can be led into the canals, and perhaps this could be held up and regulated instead of being allowed to flow out at the other end into the Ghagra or Ganges.

For this purpose weirs or regulators will be necessary at intervals.

Sluices will also be necessary at the many existing outlets from the canals, and facilities should be offered to private individuals to construct channels, and, if required, to acquire land for the purpose, to act as distributaries.

4. It is not improbable that this scheme would be more feasible on the two western canals—the Daba and Gandaki—for the supply of which water seems more readily available than in the case of the Dhunai and Ghagri; and it would enhance the value of the scheme if the Jharahi river, which lies still further west of the Daba, could be connected with the Gandak in the same way as the Daba and similarly treated. The Jharahi is at present a sluggish stream from which irrigation is practically impossible owing to its steep banks, and the neighbourhood of which is particularly unhealthy and malarious. It runs for nearly 20 miles of its course in Saran through the Hatwa Raj, but leaves the Gandak at a point in the Gorakhpur district.

5. If the canal system is improved and extended the next important point is the question of reconpment of cost

to Government. I do not think it wise or equitable to attempt to recover the 7 lakhs already expended. The benefits have been barely sufficient. Neither would I attempt in any case to recover by means of a water-rate, because in many years no water would be taken, and also because of the great difficulty in measuring up and assessing the water taken for watering rice, which experience shows would often be benefited by irrigation in September and October when the *hathiya* rains fall.

6. I also consider that it would be difficult to levy a cess on the owners or occupiers of the land benefited only. It would perhaps be possible to define the area protected, and levy a cess on all lands within this area; but the definition would lead to endless objections on the part of those whose lands were on the boundary, and increase the Collector's difficulties considerably. It would also be unpopular, and, although perhaps strictly equitable, would seem invidious. It would also require legislation.

7. The embankment cess levied from *all* estates in the Saran district for the maintenance of the Gandak embankment, although all estates are not equally benefited or protected and many are not protected at all, affords a precedent for a general cess such as I would advocate. I would in fact regard the embankment and canals as one system. It is the construction of the embankment, that by closing the mouths of the drainage channels, has rendered the canals a necessity, and the latter are a direct result from the former. Such being the case, I would increase the embankment cess by a sum sufficient to pay a small percentage on capital outlay, and to cover working expenses. Even if nothing more were done to the canals I would recommend this, but presume to urge that their extension and improvement is essential on the lines roughly indicated in the earlier part of this note.

8. I may add that the improvement and extension of the existing canal system is necessary, in order to permit of the execution of the various small schemes—some of which have been referred to in Mr. Simkins' note—for opening out for both irrigation and drainage purposes the many old drainage channels in the district as protective works.

9. It is unfortunate that a fresh contract for 20 years has recently been completed with the zamindars to pay embankment cess. But it would be possible to ascertain whether, if the improvements and extensions are made, they would object to a revision of the contract before the expiration of its term, and if not work could be started. The advantage of adding the canal cess to the embankment

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cess would be that no legislation would be required, such as would be necessary if a separate canal cess were imposed.

10. The question of control arises. If things are left *in statu quo*, it would probably be best to hand over control to the District Board, which is a representative body. But in that case it would be extremely hard to throw upon the District Board the burden of providing out of its existing revenue the cost of maintenance. It would be hardly fair for Government to get rid of its responsibility in this way by transferring the charge from Provincial to Local revenue. At the same time it would not be advisable or very useful to give the District Board power to sell the water. This would lead to endless difficulties, and would of course merely mean that in the end the Collector would have to assess and collect the rate. Perhaps some arrangement might be made by which the Provincial Government and the District Board should share the cost of maintenance, the latter supplying the control, until the next revision of the contract for the embankment cess, when the cost of maintenance of the canals should be added to the cost of the maintenance of the embankment, and collected by Government—so much of the proceeds as represent the former being handed over annually by Government to the Board.

11. But if the system be improved and extended at the cost of considerable additional capital outlay, I am doubtful whether a local body like the District Board could be well entrusted with the duty of control. It might be too big an undertaking and might necessitate a special staff so large as to require too much of the District Engineer's attention and swamp other work. At the same time I do not feel disposed to give up the idea entirely. It will be necessary to wait and see what the Board's responsibilities will be.

It would seem that although section 53, clause 8 (1) of the Local Self-Government Act forbids the construction of any channel from District Board funds for the purpose of irrigation, there would perhaps be no legal objection—after due notification by the Lieutenant-Governor—to make over the control of such channels for sanitary purposes under section 58 of the Act. The fact that they would be used for irrigation could not affect the question as long as Government is content to give over its right to control.

Of course in this case the proceeds of that portion of the embankment cess which represents the additional cess for canals must, less cost of collection, be made over to the District Fund.

Copy of Mr. Graham's letter dated 19th October 1902, to the Commissioner.

With reference to your memorandum No. 5101 G, dated 17th October 1902, forwarding Government of Bengal's letter No. 21 T. R., I have the honour to submit below the names of three gentlemen whom I have selected to appear as witnesses before the Irrigation Commission on the 23rd and 24th October:—

Mr. J. D. Macgregor, Arwahah Concern.

Mr. M. Mackenzie, Durhoga Concern.

Mr. G. Penn Simkins, District Engineer, Saran.

Messrs. Macgregor and Mackenzie are Indigo Planters of experience and will be able to give evidence from the point of view of the planting community, while Mr. Simkins is thoroughly acquainted with the district and will be able to represent matters from the point of view of the District Board as well as from an engineering or professional point of view.

2. I am also forwarding a short note by Mr. Simkins dealing with certain irrigation projects for this district which are under consideration.

3. It is a matter for regret that Saran was not included in the tour programme of the Irrigation Commission since both its density of population as well as its circumstances of soil and climate undoubtedly entitle it to consideration. I trust, however, that the Commission while at Bankipur will be able to devote a little of its time to the discussion of irrigation projects for this district and will place on record any conclusions which may be arrived at. I have purposely restricted the number of witnesses selected by me to three though more could easily have been obtained because I see it anticipated that not more than four witnesses will be examined in a day.

4. The history of Saran affords a very excellent illustration of the danger of meddling with nature. Some time

in the last century (the first mention of it is on records of the year 1700) what is known as the Saran embankment was built in order to save the district from floods, and this object no doubt was accomplished, but at a cost which would certainly have caused its promoters to hesitate could they have foreseen the results. For though the exclusion of the Gandak water doubtless prevented the recurrence of floods it caused an entire change in the drainage of the country the effects of which are still distinctly visible. For whereas formerly the Dahn, Dharai and other water courses were fair-sized rivers pouring a large volume of pure fresh water through the district and navigable some of them for large boats all the year round they are now only sluggish streams, and in fact during the greater part of the year are a mere series of stagnant malarious pools the neighbourhood of which is so notoriously unhealthy that people do not like to live near them. In short the erection of the embankment effected what was in reality merely an exchange of evils. It secured the district from danger of floods, but rendered it liable to a still greater evil, *viz.*, drought. There can be no doubt that the character of the district was to a great extent altered by the erection of the embankment and as time went on and this was more and more realised irrigation projects on a large scale were brought forward. These projects by strange irony of fate seek to restore by artificial means what was the natural state of things many years previously, *i.e.*, before the erection of the Gandak embankment. They do not however stop there. They seek something more. For while they seek to bring the water of the Gandak into the district they aim at doing so in such a way as to effectually irrigate the whole district while incurring no risk of inundation. In other words what is wanted in Saran is a well regulated supply of water which will secure the district against fear of drought without rendering it liable to flood.

5. As regards supply of water Saran is particularly favourably situated since the Gandak at certain times of the year is capable of furnishing an illimitable supply, and all that is required is to regulate and distribute it. I propose to consider very briefly how far attempts to regulate and distribute it have succeeded in the past. But before doing this I must say a word or two as to the need for irrigation. As regards this there can, I think, be no two opinions; the annual rainfall of the district is a very short one, *viz.*, 40 to 50 inches only, and experience shows that it has a tendency to fall periodically with a resulting widespread or partial failure of crops. There were famines in this district in 1806, 1874 and 1896 and partial failure of crops is a by no means uncommon thing. Indigo, rice, maize and other crops require a constant supply of water, especially rice, while the *rabi* crop, most important of all, needs a sufficient amount of moisture in the soil in order to be successful. If a properly regulated supply of water could be ensured failure of crops would be an unknown thing.

6. Unfortunately the history of the Saran canals has been a history of mismanagement and failure. The idea of belting into the district the water of the Gandak which had previously been excluded with such care seems to have first arisen in the seventies, by which time no doubt long experience had shown conclusively that the Saran embankment had not proved such an unmixed blessing as was originally anticipated. In 1876 two planters of this district, Messrs. D. Reid and F. Murray, began to agitate for a canal scheme in order to save the crops and it was ultimately decided after a good deal of discussion to adopt a scheme consisting of the following works:—

Head cut with sluice at its head from Sisua to Bijarpur, 6½ miles in length.

Feeder channels from the Kupan-Chap-Sota to the following new sluices:—

- | | |
|-------------|------------|
| 1. Dahn. | 3. Dharai. |
| 2. Gaudaki. | 4. Gangri. |

These works were carried into execution on a guarantee agreement given by the Indigo planters of the district. The administration and working of these canals however was a failure from the commencement and the chief conclusions arrived at may be stated as follows:—

- (1) That the agreement between Government and the guarantors needed revision as the condition that "the guarantee should be paid if water is supplied in the canals in all the months of the year is almost an impossible one to carry out on any system of canals, and specially on the Saran Canals."
- (2) That it would be unwise to spend more money on the canals as the source of supply is not to be depended on.

(3) That an unpaid administrative staff is a failure and cannot be relied on. When a new agreement is entered into provision should be made for a proper staff to prevent surreptitious banding of canals. Collections should be made if possible by the Collector.

(4) That the scheme is imperfect, though it benefits the guarantors and is worth more to them than the sum annually paid by them, *i.e.*, Rs 21,750.

(5) That Government is a loser to the extent of about Rs. 80,000 annually and the guarantee should be increased by that amount or other arrangements made to cover the loss.

7. The above conclusions are taken bodily by me from a report on the Saran canals by G. W. Faulkner, Esq., O. E., written in the year 1885, and there is no doubt whatever that representing as they do the results of actual experience they would be of great value if the question of irrigation were seriously taken up again. It is to be remembered however that the position has very much changed since that time, and that the Indigo industry which was then flourishing and able without difficulty to guarantee a sum of over Rs. 20,000 per annum is now in a very bad state and would certainly not be prepared to guarantee even half of that sum.

8. Under existing conditions a guarantee would hardly be feasible and the best plan now would probably be to pay for irrigation works by means of a small canal cess. A pie or two in the rupee would be sufficient and the tax would not be an unpopular one since it would confer a benefit which would be appreciated by all classes.

9. The second conclusion mentioned above, *viz.*, that "it would be unwise to spend more money on the canals, as the source of supply is not to be depended" has hardly been borne out by experience. Experience shows that if the canals are opened at the proper time, *i.e.*, during the rains and before the water in the *sota* has fallen too low any quantity of water can be obtained and the cost of bringing it into the district is insignificant. But, and this is the most important point of all, it is no use being satisfied with merely bringing the water into the district. There must be a system of proper regulators at every four or five miles in each of the canalised rivers and a system of channels for distributing the water. Otherwise it merely comes in at one end of the district and goes out at the other and accomplishes very little good.

10. Of late years there has been no systematic working of the canals at all, but it has been the custom to apply to Government to open them whenever the prospects of the crops appear to be in doubt. This too is a direction in which reform is required for the direct control of the canals rests with the Public Works Department which rightly or wrongly has gained a reputation for obstruction. The fault however lies not so much with the Public Works Department as with the system which makes the cost of working the canals debitable to the Public Works Department while it provides no special fund for the purpose. This is the secret of the opposition which has been met with in recent years for the Public Works authorities.

11. Then too it has been a general subject of complaint that when the canals are opened they are mismanaged. Water is not let down then in sufficient quantities and just when it is most wanted there is none available because cross bunds have to be erected in the *sota* and the Public Works Department refuse to make them until the cost is guaranteed.

12. There can be no doubt that the teaching of experience is clear on two points, *viz.*—

(1) The cost of opening the canals should not be debitable to Public Works Department funds. The money should be provided in some other way and should always be available in case of emergency.

(2) The actual control as distinguished from the charge of the canals should rest not with the Public Works Department, *i.e.*, with some high official in a hill station many miles from the place itself but with the district authorities who are on the spot and are in a position to know exactly where irrigation is required. Prompt action is everything; and the present system has been found to be anything but prompt.

13. The chief arguments to be urged in favour of improving the Saran Canals are as follows:—

(1) Insurance against drought and consequent failure of crops.

(2) From a sanitary point of view the flowing of a volume of pure fresh water through the various streams in the district is an excellent thing. It scours them out, provides good drinking water for the people, and renders the banks of the rivers habitable with safety to health which they certainly are not now.

(3) Thirdly, it is a recognised fact that the opening of the canals has the effect of raising the spring level throughout the district, which gives the moisture in the soil so necessary for the *rabi* crop. It, at the same time, raises the level of all the wells—in itself a very great benefit indeed.

14. I think there can be no doubt that the opening of the canals even as they have been worked this year is a great boon. From one or more of the points of view above mentioned, and even if more elaborate irrigation projects are found to be impracticable I think that it would be a good thing if the canals were opened as a matter of course every year at the season when it can be done with least expense. There is nothing at all to be lost by opening them, and on the other hand there is much to gain. The cost is trifling, if done at the proper time and might conveniently be met by the District Board who could provide for it annually in their Budget being recompensed in return by being vested with the control of the canals. This would certainly be a more satisfactory arrangement than the present one.

Copy of Mr. G. Penn Simkins' letter dated 9th October 1902, to the Collector.

With reference to Commissioner's No. 5176, dated 26th September 1902, I beg to hand you herewith a note on Irrigation works in our Famine Relief Programme. The particulars of the surveys of two projects, referred to, I will send you as early as possible.

Irrigation Projects.

The bulk of the so-called Irrigation projects in the Famine Relief Programme for the district consist of small works such as cleaning out and re-aligning existing cuts and *gains* taking off from the local rivers and leading to and from *chaurs*; these cannot be looked upon as Irrigation works except in a very small way. Real Irrigation works are such as will, after construction, either materially improve a certain area of country or act as reliable preventatives of famine or scarcity. In the event of a failure of rainfall, etc. Of such works there are only three in our present programme, *viz.*, canal from Mahair Chaur to the Hardia Chaur, channel from Ambicapur to Daraunda, *viâ* Barharria (30 miles in length), channel from Gandaki to Awasta (25 miles long). Of none of these have we, at the time of writing, any actual working particular. A has, I am given to understand, been surveyed through the agency of the Public Works Department and a report is under consideration. B, Mr. Hutchins of Tagapur, the proposer of the works, gives some interesting details in his letter of 14th July 1902 and a reconnaissance survey is in hand. C, we have no data, but I have put in hand a reconnaissance and will be able to give some information on both surveys in a week or so. Other works which might, with great advantage, be entered in the District Programme of Relief Works are (1) canal from Nagra to Chuprah, (2) canal from Chirind to Gurkha. No. (1) is a work which would be of great benefit and by no means difficult of construction. There is, at present, a sluice on the Gogra at Chuprah and all that is required is a weir under the Road Bridge at Nagra and a sluice to control the water in the Gandaki, where this canal excavated the supply of water to the *chaurs* to the north of Chuprah would be assured; this year owing to the lateness of the rains, these *chaurs* are only about half cultivated; had a canal existed, water from the Gogra could have easily been passed on to them and so have secured a full crop. No. (2) would also be a most useful work; there is a large area of rice "*chaur* land" between Gurkha and Chirind which is dependant now, solely on the rainfall, for its water-supply and consequently in a year like the present, when the rains have been delayed and comparatively scanty, a large portion of the *chaur* is empty of crop; had a channel of any sort existed, the water from the Gogra could have been led into these *chaurs* and the rayats would have been enabled to have sown out their *dhan* seedlings.

As mentioned above, the other Famine Relief Irrigation works are the clearing out and re-aligning of small drainage and other channels; these all depend for their usefulness on the actual working capacities of the various canalised streams in the district, and I am afraid till some practical system of rendering these streams more useful than they

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are at present, is adopted, the usefulness of the small subsidiary channels will be nil. The opening of the Saran Canals may do good to a certain, limited area of country, along the upper reaches of the canalized rivers, but the benefit to the district as a whole, obtainable from them as worked at present, is very restricted; where due arrangements made for the conservation of the water, which is let down the local rivers, then the utility of those channels and pains would be great, but as matters stand they are of very little practical value. Except perhaps as work giving

occupation to a certain number of workers in times of scarcity, which really ought not to exist. A very good example of what can be done is seen at Dhangaraha on the river Dhana, where weir was put in some years ago by private enterprise, the existence of which has supplied the means of irrigation to a tract of country extending nearly 5 miles long on both banks of the stream; what has been done at Dhangaraha could, I believe, be done at other places on the various rivers, with equal advantage.

1. Q. (The President).—How long have you been in this part of the country?—Two years and four months. As Collector of Saran, until July 1st of the current year.

2. Q. Have you had previous experience of this part?—Not of North Bihar.

3. Q. I say that the whole district is shown as liable to famine?—That is in the "famine programme," submitted to Government, but I would modify that by saying that the whole district is liable to scarcity and distress, and that some parts of it are liable to severe scarcity and famine. It is difficult to define which parts. The phrase quoted is an over-statement.

4. Q. What do you consider the best measure to take for this district to minimize famine?—The best, I can think of, is to improve the existing system of the Saran Canals, by which we can get a larger supply of water down the canals, and, when we have got it, to regulate it.

5. Q. These Saran Canals are closed altogether now?—Practically. They were opened this year during the last cold weather after pressure had been put on by the local authorities.

6. Q. What irrigation are they calculated to do?—They are said to be able to do about 64,000 acres, but the most ever done was in the year 1884-85, when they did about 21,000 acres. Perhaps they could do about 6,000 or 7,000 more. The difficulty was with the working of the canals. That water was not received when it was wanted. It was the complaint of the local planters. The canals were constructed after the famine of 1873-74, and they were opened on a guarantee given by certain indigo planters. Money was received from Government direct and from the planters, and they recovered from the ryats who used the water, and they also used the water for filling their tanks, etc. But it was an unsatisfactory arrangement to everybody.

7. Q. The theoretical *maximum* might run up to 64,000 acres?—That has been stated. We have 72,586 acres irrigated from private irrigation works and 121,000 acres of well irrigation. The former figure is taken from the survey, but the latter is made by merely multiplying the number of wells by a certain figure, and I doubt if it be correct. They have multiplied by four. There are 27,000 odd masonry wells and 3,000 odd *kachcha* wells.

8. Q. That is not an extravagant calculation for the acreage of wells?—I doubt whether they do quite so much. I think three acres each would be a fair estimate.

9. Q. How do you recommend that the Saran Canals should be administered in the future? Should Government take it over at once as an imperial work?—No, it is far too small a thing. It would be better if it could be improved and afterwards handed over to the District Board to work. I do not imagine the water would be taken every day for irrigation. Saran is a big wedge between the Gogra and the Gandak, and the Saran embankment runs along the south or right bank of the Gandak and was constructed a good deal more than a hundred years ago and was taken over by the Government at the end of the eighteenth century. It was constructed to protect the whole district from flood; in so doing it closes the mouths of the spill channels which come across the district from the north-west to the south-east. They take their rise in the Gandak mostly. By closing these spill channels, naturally the water received by these channels which are small rivers has been very much reduced, and whereas there was deep water in most of them and navigation, practically no boats can go along them now. In many years we do not want irrigation from these rivers; but when we have a year of drought, every drop of water in the district is utilised and the cultivators are very clever in utilising water in every possible way; and now that the channels which form the so-called canals are closed, it looks like a sin that the water cannot be got down when we want it.

10. Q. How do you get the water from the rivers on to the land?—By lift; there is no flow.

11. Q. If these canals were improved, they might be really a source of value to the district?—Distinctly.

12. Q. What do you propose? That a Government officer, an engineer, should be sent to thresh out what can be done and to prepare a scheme which Government should carry out and make over to the District Board?—Another idea has been suggested that the District Board should be given the power to construct the works.

13. Q. With what money?—Borrowed from Government. But I am not personally in favour of that.

14. Q. I suppose it is possible that if it were done, the works might be on a larger scale and more irrigation done?—Yes. But we should not want much larger irrigation except in a few years. Another benefit, which would arise, would be the raising the level of the water in the wells all along this tract. It is a known fact that when the canals were opened regularly, even with the flow of water that they then gave, the well level was raised four or five feet in neighbourhood, and that is a very great consideration. Secondly, there is the sanitary consideration. At present these channels run quite dry after the rains, and they become merely a series of malarious pools, and if we can hold the water up by small weirs in places, we can benefit the district from a sanitary point of view. The banks are notoriously unhealthy. The river Jharahi should also form part of the scheme.

15. Q. At present there are really four schemes independent of each other?—It is one scheme. They all come from one river.

16. Q. But the making of one does not imply the making of another. They each stand on their own basis?—Yes, but with all four it would be very much better.

17. Q. Why were they closed?—Because of the difficulty of finding money to keep them open. Government insisted that before they were opened a certain guarantee should be given and subsequently certain other rules were devised by which an individual wishing to have them open must put down a certain sum of money. No one will come forward and do that now. The indigo industry is not flourishing now, and the only people with enterprise are the planters; the zamindars would not combine for that. The Hutwa Raj which owns most of the northern part would, but they would work it entirely for their own benefit; it would not be a public thing. The cost of constructing and maintaining these canals has fallen and will fall on Government, and naturally Government requires to secure this money, and thus the question of recouping this money arises at once.

18. Q. Would the cultivators of that tract be willing to accept a cess?—Not the cultivators; they would pay, probably, if it were ordered, but I would propose a cess on the zamindars.

19. Q. They might kick against it?—If it were not a very large one, there would be no great opposition especially if they were to recover half of it from the ryat as with the road cess. Or, looking at it as part of one scheme with the embankment, on the ground that but for the embankment the canals would not be necessary, and thus regarding the embankment and canals as one protective system, there might be one cess. That is to say, that a small water cess might be added to embankment cess and levied on each estate in the district, whether actually protected or not by the canals. The cess has already been levied in this form by contract since 1881 when Sir Antony MacDonnell was Collector of Saran. It is about Rs. 23,000 a year only on the whole district.

20. Q. To carry this out it would be, I suppose, a case of a tolerably severe cess until the work was done, and then a light cess for maintenance afterwards, or are you prepared to borrow money from the Government to spread it over more years?—Cannot Government be content with interest? We could have a cess to cover Government interest and cost of maintenance perhaps.

21. Q. You think they would take the water every year?—Not all. In some parts, as in the Hutwa Raj, they would take it for their rice nearly every year.

22. Q. In what part of the district is there most well irrigation?—Pretty well all through the district.

23. Q. The district is not given up body and soul to rice?—No; the rice is about 25 per cent. only. The most important crop is the *rahi*.

24. Q. Are the wells on the increase in number?—I should say they were.

25. Q. Have you been asked for *takavi* advances?—Not since I have been Collector. The Opium Department have done a good deal in that way. The Hutwa Raj has done something and will probably do a great deal more. Every year it gives advances for the purpose.

26. Q. Have you had any forecast estimate of what it would cost to put these channels in order?—No. I do not look upon this at all as a productive work, but merely as a protective work against certain bad years, and over a period of 30 years there have been four years in which we have had to spend money in relief somewhere in the district in some form or other.

27. Q. Have you any land in your district, the right bank of the Gandak, where the people object to irrigation; think that it deteriorates the land?—No. There is a general idea—"once irrigate, always irrigate," but that is the only fear. They use well water all over the district.

28. Q. There are a number of dug tanks, apparently, in Saran?—Yes.

29. Q. Do they make any appreciable effect on the irrigation?—They are not of much value; they are so small. They irrigate wheat, barley and sugarcane considerably and all market garden produce and opium.

30. Q. Would you advocate the encouragement of wells?—Yes.

31. Q. Is opium extensively cultivated?—Yes.

32. Q. (*Sir Thomas Higham*.)—I understand that when these channels were first opened they were handed over to the planters. Were the planters responsible for their maintenance?—No. They took the water, distributed it and paid for it.

33. Q. Why was not that arrangement satisfactory?—I would rather other witnesses answered that question. I was not here at the time. There is a certain expense every year for cross bunds, etc. They used to say that the maintenance, including establishment, cost Rs. 30,000 a year, and the last few years it has cost about Rs. 6,000, I think. No one personally will come and put down Rs. 6,000. That is why they were closed.

34. Q. You cannot put on the cess with the law as it stands; can you?—Yes, if the zamindars would agree to add it to the embankment cess, and I do not see there would be much difficulty about them. The only practical difficulty is this that the embankment cess contract has now 18½ years to run, because we have just started a new contract for twenty years.

35. Q. What is the contract?—An estimate is made of what it will cost the Public Works Department to maintain this embankment during 20 years. That is divided by 20 and the sum annually recovered from the zamindars.

36. Q. Is the number of wells increasing every year?—I think so.

37. Q. Do you make advances for them?—No; a few advances may have been given in 1896-97 by the Collector; but advances are continually given for this purpose by the Opium Department and the Hutwa Raj.

38. Q. Only for the cultivation of poppy?—Yes, in the case of the former, but not in the case of the latter.

39. Q. If you had weirs, would you charge for each watering?—No; it would all be covered by the cess.

40. Q. So some people would get the benefit of the weirs and others would pay for them. These weirs confer a special benefit on a certain number of proprietors near them; but to secure them is the only possible way to put a cess over the whole district?—There is another method to estimate the area protected and have the cess realised from that area. That would be more equitable, but difficult.

41. Q. (*Mr. Blair-Mackenzie*.)—Do you consider the district is likely to be exposed in any year to very acute famine? I see the numbers in the 1874 famines were exceedingly large. Do you consider the 1896-97 famine was absolutely as severe in failure of

rain and crops?—We should probably never be likely to get anything more severe than the 1896-97 famine under similar conditions.

42. Q. What will be the total area which this system of canals would irrigate: 20,000 acres?—A great deal more than that. It might be a hundred thousand, but perhaps not.

43. Q. That is in addition to the 72,000 already?—That is private canals; I don't know what those figures mean, but believe they refer to existing drainage channels improved by certain landed proprietors such as the Hutwa Raj, and some indigo factories for irrigation, but these are largely dependent on water remaining in the canals or channels which are now closed.

44. Q. Are there any instances of extensive areas being irrigated by wells?—Not in Saran.

45. Q. What is the crop; highly intensive cultivation highly manured?—Generally in the neighbourhood of villages.

46. Q. Do they over irrigate wheat?—Yes; but not in a year of good moisture.

47. Q. Are the wells worked with bullocks or lever?—Both; the lever mostly.

48. Q. According to the figures here the area under irrigation is about a half?—It must be more.

49. Q. Would a third be protected in a bad year?—That would not include the Dearnas irrigated by the spill from the river. Last year, when there was considerable want of moisture, the rayats were making *kachcha* wells very considerably.

50. Q. Do you think a large extension of wells is possible in that district? Would there be difficulty in finding manure or money to make the wells? Could they be doubled?—I dare say.

51. Q. Are you satisfied with the machinery at your command for giving advances?—Yes.

52. Q. Is there any difficulty in giving advances owing to the cultivators having to come in to head-quarters?—That we could meet ourselves in utilising the planters, and although this is not provided for in the rules, I believe money was so advanced under the Agriculturists' Loans Act through the medium of selected planters in 1897; and I may add that in the same year in Cuttack (Orissa) I sent money out to the rayats in their villages by a Deputy Collector.

53. Q. How would you advance through the planters?—Make inquiries first as to who wanted them, and then entrust the money to the planters and also by getting the selected planters to make the necessary preliminary enquiries.

54. Q. (*The President*.)—Mr. Tytler in his paper says he advanced Rs. 1,86,000 to build wells, and he was able to do this largely by his own personal influence, having devoted his whole time and energies to this particular work. Do you think it would be an advantage to have at any rate, for a time, a special officer to push it in that way?—Yes, if the need is distinct.

55. Q. Are you not satisfied that the need is distinct?—I should like to see first the rivers properly utilized. That would protect a very large portion of the district.

56. Q. Mr. Tytler says it would be possible to have a well in every 10 or 15 acres of the district?—In some parts.

57. Q. Is there no danger of exhausting the water in the sub-soil?—Not, if we have water coming down from the rivers.

58. Q. (*Mr. Rajaratna Mudaliar*.)—Could not the proprietors pay the cost of keeping upon these channels and recover from the tenants?—It would require legislation.

59. Q. They can levy enhanced rents?—It is only required for protection; not every year; it is not with a view to increase produce. Nor could they enhance the rents legally.

60. Q. You say the construction of the embankment has deprived a large area of the benefit of spill irrigation; what area was affected?—The whole district.

61. Q. Has cultivation suffered in consequence?—That is going back to over a hundred years. Conditions must be changed. It must have been an improvement generally, but undoubtedly individual portions have been injured.

62. Q. Do you think proprietors can be trusted to disburse loans to tenants?—Very few. I doubt whether they would

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Mr. E. F. undertake to do it. They would be afraid to deal with Government money, and I do not think it would be very safe to give it to them.

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63. Q. Is the whole of the embankment cess spent?—I believe the last contract was an actual loss.

64. Q. (Mr. Muir-Mackenzie).—Mr. Tytler got the smaller cultivators to combine to receive the advances. Is that practicable?—Mr. Tytler was an unusual person. He had been 26 years in the district and knew pretty well every cultivator personally in the north-western half of the district.

WITNESS No. 26.—COLONEL J HODDLING, Planter of Chupra.

Colonel J. Hoddling.

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1. Q. (The President).—Have you been long connected with this district?—I have been 31 years in Chupra.

2. Q. Were you there in scarcity or 'famine'?—Five times in my recollection.

3. Q. Famine?—No. There will never be a famine in Chupra. The means of communication are so plentiful. But I have been there in five periods of scarcity when they did not know where to turn for a penny.

4. Q. What recommendations would you make to mend matters?—One method is obvious; the working out of this canal plan which Government started in 1882,—the canal Mr. Growse spoke of.

5. Q. What would be the best course to adopt for the future working of that canal?—It is a very long story and there is a great deal of bitterness and feeling about it. It was promised that if the planters guaranteed to pay a sum to Government for outlay and maintenance on the canal, it would be opened. The sum was divided among eight planters and there was a clause in the agreement:—"No water, no payment." We were continually being disappointed about the water-supply, and when we claimed remissions of our guarantee, we were met with all sorts of objections. There was also a clause that we were to collect from all the rayats who took water, and that in cases where we could not realise the money, the Collector of the District should take action under the certificate procedure. In almost every case when we wanted to go in for the certificate procedure the Collector, I am certain owing to great press of business, was unable to carry it out. (The certificate acts as a decree of the Civil Court.) There is hardly a guarantor who has not large outstandings to this day, because the certificate procedure was never enforced. When the agreement expired Government then said—"We will now enter into a fresh agreement. Your guarantee in the past was not sufficient. You will pay a higher guarantee, and we will cut out that 'no water, no pay' clause, and you shall pay this higher guarantee whether we give you water or not." The guarantors refused to accept these terms since then. The Canal Department has persistently refused to open the canals unless we will pay down on the nail the sum they fix on before any work is done.

6. Q. What is that sum?—Rs. 21,900 was the last estimate. The canal protests 1,700 miles of country. In 1884 when the canals were not working properly they actually irrigated 21,000 acres.

7. Q. What would be a reasonable *modus vivendi*?—The planters are not in a position now to guarantee anything. Indigo is in such a condition that it is no use discussing any *modus vivendi*, because the planter has practically ceased to exist.

8. Q. He exists as a zamindar?—He is hanging on, but I am afraid his last hour is very close. He cannot get money to work his factory, much less guarantee anything to Government. You can only think now of protecting the district from distress and the planters must be left out of the account. If the scheme were taken over by the District Board, it could be worked perfectly at a small cost. Up to 1884 it cost Rs. 32,000 a year according to Mr. Faulkner's account, but that included three or four engineers, a large subordinate staff, pension list and leave allowances. The actual working cost since 1892 works out at Rs. 6,200 a year.

9. Q. Would the cultivators accept the cost of making and maintaining as a cess?—Without much difficulty. About two pies in the rupee would cover it.

10. Q. How long have the canals remained closed?—Since 1892 when our guarantee expired. They carried it on under a modified guarantee for two years more.

11. Q. And you think that all that is wanted would be a trifling outlay on maintenance and the opening of the sluices?—It would be no use unless you put weirs at intervals of, say, 10 miles on all the canals. Perhaps Rs. 2,000 a weir would do it. I am building a weir now myself, and it won't cost me more than that.

12. Q. That is cheaper than we generally do it. Do you think it would be a great boon to the district to have these

canals opened again?—It would save an enormous amount of distress. They would be used whenever the rainfall did not come at the right time for rice, and for high land cultivation in years of drought, which is about once in six years in Chupra.

13. Q. In these dry years were the crops on the higher grounds all lost?—Absolute failures.

14. Q. If these canals were opened again; would they be enough for the district of Saran with weirs in addition?—Yes. The Chupra District is divided into two classes of soil. In about $\frac{1}{2}$ crops are sown on natural moisture. This is the area required to be protected. One quarter is another class in which all crops are sown practically on irrigation. That already has its wells. I cannot speak from personal experience of this quarter of the district. The wells are fed by surface drainage. *Pakka* wells are not carried through the sub-soil. In the other three quarters any of these wells are perfectly useless for sowing crops on in the natural moisture tract. A *pakka* well will do at the outside five *bighas*; that is light after watering. The part for sowing on with wells is where there is no sandy sub-soil. It would cost me Rs. 500 to cut a well through that sand for good drinking water. I would be on a spring 30 or 40 feet deep.

15. Q. That would pull you through a drought?—No; it would not do more than five *bighas* a day. A *bigha* with me is $\frac{2}{3}$ of an acre roughly, i.e., $\frac{2}{3}$ of an acre.

16. Q. (Mr. Muir-Mackenzie).—Is there much room for the extension of wells in Saran?—If they had to replace the natural moisture with artificial moisture, they would be no use at all. A well every hundred yards would be required when we do want water. It takes a lot of water to make up for the failure of the rains.

17. Q. (Sir Thomas Higham).—How would you increase the embankment cess to include both?—It would require legislation. I do not think the zamindars would pay anything unless they were obliged to. They may be induced to agree, but I should not be hopeful of persuading them myself.

18. Q. Was the year in which 20,000 acres were irrigated a dry one?—Yes. There was water coming down and the rayats took it. The canals were not working very well. The district wanted water two or three times since and we got it in November and December, when the rice was dead and it was too late to sow the *rabi*. They would not open the canals before the rains began. I blame nobody, but it could have been done, if the work had been commenced in time.

19. Q. Taking 21,000 acres as a maximum done, will you increase that largely by putting weirs on the rivers?—Yes, and by also making the most of small works from one channel to another. Certainly more than 21,000 acres could be irrigated. You might do 100,000 acres with cheap works. The part of the country unprotected by the canals is that which is always irrigated and therefore presumably adequately protected by wells.

20. Q. (The President).—Should the District Board be encouraged to borrow from Government a sufficient sum to put these works in order and to control them afterwards, Government giving them power to levy a cess? It would be a perpetual burden upon the district?—Yes, but now whenever we are going to have distress, the District Board has to set aside a large portion of its funds to meet it. We had relief works in 1892, in 1895, in 1879, in 1874, the Bengal famine, and in 1866, the worst famine of the lot. The relief works were making roads, which we do not want; we have the best roads in Bihar, and digging tanks in sandy soil, which is absolutely useless.

21. Q. (Mr. Muir-Mackenzie).—Have you perfect confidence in the efficiency of the District Board?—Yes, perfect.

22. Q. (Mr. Rajaratna Mudaliar).—With what agency would they manage these works?—I would increase the District Engineer's staff. The rest might be left to the Collector.

23. Q. Why should the District Board management be more efficient?—Because it is directly interested in preventing scarcity. No doubt the Engineering Department would do their best, but it is not a productive work; it would not, in their opinion, compare with schemes that pay Government, and they would not have the direct interest in combating distress.

(Mr. Hare).—In 1892 Darbhanga had to run into debt of two or three lakhs. The Board has to hypothecate an income for relief works.

24. Q. (Mr. Muir-Mackenzie).—You have a strong District Board?—Yes, I think so.

25. Q. A lot of planters on it?—A lot of Europeans on the Board.

26. Q. (Mr. Rajaratna Mudaliar).—Would the cultivators take water for 100,000 acres every year? Or would you only get applications once in six years?—Generally speaking, they would take it about once in six years.

28. Q. And would the District Board undertake the construction of all the improvements for a payment of two pies in the rupee?—I believe that would be quite sufficient.

29. Q. Would it not be right to charge at least a rupee an acre?—If you are going to levy a water-rate you want extensive machinery for collecting it, and then you must have a large establishment. Two pies in the rupee, I suggest, would be paid by the landlord who would be allowed to make his own arrangements for collecting half from the mynts, but it would be paid as part of his revenue.

30. Q. Could they not be induced to collect the water-rate by a commission of about five per cent.?—Not in our part of the world. If you laid a two-pie cess, the rayats would say it was a Government order and must be carried out; but if you tell the rayat he has to pay something down, he would say "it is not necessary" and he will not do it. The two-pie cess would give Rs. 52,000 in the Chapra District. I would put it over the whole district. The cause of this want of water in the Chapra District was the making of the Gandak bund. It was thought right to charge the whole district for the benefits of the Gandak bund, and I do not see why it is not just to charge the whole district for this cess.

31. Q. One wrong does not justify another?—I am not prepared to say that the first cess was an injustice. By opening the canals the spring level of the district will be kept up. A rainfall of 40 inches gives a *rabi* crop; a rainfall of 20 inches will give nothing. If you have the water level kept up, you will get a good crop, possibly with even only 20 inches.

32. Q. One man gets a direct benefit and another an indirect one, but you would make both pay equally?—Yes, but to be absolutely equitable you would require very extensive machinery for collection, and the whole scheme would be put out of the region of practical politics altogether. The people say—"But for the Gandak bund we should have had the water we require. Others have had their benefit from the bund; we want our benefit now by the opening of it."

Colonel J. Hoddling.

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FOURTH DAY.

Muzaffarpur, 28th October 1902.

Witness No. 27.—MR. A. OGILVY, Manager, Hatwa Raj.

1. Q. (The President).—You are Manager of the Hatwa Estate?—I have taken over the management within the last six months.

2. Q. Have you other interests in Saran?—I have managed properly there. I have had an acquaintance with the district for 25 years.

3. Q. Is there any strong feeling in Saran as regards the improvement of irrigation or necessity for having it?—There was a very strong feeling in the Hatwa Raj last year as regards the importance of having the four existing canalized rivers opened practically at a moment's notice when they are required.

4. Q. Those being the four that have been mentioned and that have been closed for some time?—Yes, and in addition to that I think the position of the Hatwa Raj is one in which irrigation should be possible for even a larger area than these four rivers can command; there are two other rivers that could be put in the same position; they would not be remunerative, but they would be useful as protection against famine. This, I believe, could be done at very small expense, and it is a question whether it would not be worth while to do it.

5. Q. Would the water be used in ordinary years?—Not of the extension; a certain amount would probably be used in ordinary years; although the rainfall may be ample, there is great irregularity and irrigation may be required at a moment's notice to produce the best results.

6. Q. Elsewhere we have found sometimes that a superior sort of rice may be grown if the people can rely upon the water with certainty. Is there any likelihood of that here?—I don't know in Saran. It probably is due in other districts to irrigation altering the character of the land brought under rice; that is, rice being introduced into a new sort of soil. I think it is possible that it would have some slight effect.

7. Q. To put these canals in Saran into proper working order, I suppose a considerable outlay would be required at first?—I think a fairly large outlay is required for putting in sluices, so that the water is brought to a useful level.

8. Q. Would it be necessary to throw weirs or bars across at the heads of distributaries?—Yes, I don't think that would cost very much; they would be small works.

9. Q. Would the district be prepared to pay for their works?—I can only speak for the Hatwa Raj; it represents about one-fifth of the district. I think the Hatwa Raj would be well advised to agree to considerable expenditure as protection against famine.

10. Q. I have no authority for saying what view the Government would take; assuming that Government were willing to grant a loan at a certain percentage, do you think the loan would be taken up in the district by the District Board or any other machinery that there might be? Would they be inclined to assume responsibility for a debt of that sort?—I think so.

11. Q. Would the District Board like to carry out the works, or prefer that the Public Works Department should carry them out and then make them over?—I think the District Board would be well advised to have it done by the Government, and then take them over.

12. Q. Should recovery be by cess or water-rate?—I think it must be by cess, because the work is protective and not remunerative.

13. Q. Do you think that would be accepted with tolerable equanimity? If they knew that the water was certain as in the case of the Sone Canals, would they be tolerably well pleased to pay a cess?—I think so. It would not be looked upon as equally beneficial in Saran which is not so dependent upon it.

14. Q. Of course, if it were laid upon the whole of the district or in a sub-division, a great many would have to pay who might not have the water?—If the extensions which I have proposed were carried out, they would practically command the whole of the district.

15. Q. Now these extensions which you propose, have they been technically examined?—No, I have asked for assistance with the view to having them examined. The thing was started shortly after I came to Hatwa.

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16. Q. It means placing sluices along the right bank of the Gandak?—It would require head-works in the Bansi nullah. I would utilize the Jarai nullah which comes out of the same *sota* as the canalized rivers. This would require a *bund*; the same as that required in the *sota* below the sluice of the Dahar river.

17. Q. The irrigation is all lift, I understand?—Yes, at present, the great desideratum is to raise the level of the water in order to utilize it by flow if possible.

18. Q. Is there any apprehension of fever from insani- tary conditions?—On the contrary: as far as I know at present, the Jarai is considered feverish owing to want of flow, but the conditions will be improved.

19. Q. Would the district be prepared for the burden of a loan?—I conclude it must be prepared to accept the burden of annual maintenance; it would require a certain amount of inspecting and patrolling establishment; it would be a very light imposition.

20. Q. Would they prefer that the whole thing should be taken over and made an Imperial work to be worked by the Public Works Department?—Not if the control is removed from the locality.

21. Q. They prefer it should rest with the Collector and the District Board?—With the Collector practically.

22. Q. The District Board has the confidence apparently of the people here?—Yes.

23. Q. (Sir Thomas Higham).—You think this should be worked by the Collector with the assistance of the District Engineer and the District Board is to be brought in for the sake of financing it?—Yes.

24. Q. I think we were told yesterday by a witness that a *bund* was made for the benefit of the Hatwa Raj to which the rest of the district would have to contribute?—The work protects the whole district from inundation (Explained on map.)

25. Q. What is your idea of the way in which recovery should be made for the cost?—I think a cess is best. I don't think a water-rate is possible under the conditions under which it would be worked.

26. Q. (Mr. Muir-Mackenzie).—The cess would be a percentage on the revenue of the zamindars?—Yes.

27. Q. Do you contemplate the District Board managing the maintenance of the canalization system?—Yes.

28. Q. Would they control the maintenance establishment, etc.?—Yes.

29. Q. And pay the men?—Yes, certainly.

30. Q. The cess would only be the equivalent of the interest on the initial works?—The cess should cover maintenance also.

31. Q. Is there any room for the extension of well irrigation in Saran?—I think there is. I can only speak for the Hatwa Raj; the Raj has constructed wells practically as fast (far?) as they can be made.

32. Q. What is the system by advances to cultivators?—We do it at our own expense.

33. Q. Does the Raj get an enhanced rent?—I don't think it would enhance its rent for a thing of that sort. We would register them as improvements as a matter of form.

34. Q. Has it registered wells as improvements up to the present?—Yes.

35. Q. What is grown under these wells?—They were originally started for poppy; there is also sugarcane, wheat, and, of course, garden crops.

36. Is there any tobacco?—No.

37. Q. Generally valuable crops that require high cultivation?—Of course a well is more necessary when high cultivation is possible. They like to have wells also in sandy tracts that cannot be irrigated without them, though high cultivation may be out of the question often owing to the distance from a village.

38. Q. What area does a well irrigate in such tracts?—Four or five *bighas* is the maximum in sandy soil, a *bigha* being equal to $\frac{1}{16}$ ths of an acre.

39. How much does a well cost?—About Rs. 70 to 80.

40. Q. Pakka?—Yes, bricks set in mud.

41. Q. How big?—Seven feet in diameter, with two levers.

42. Q. (Mr. Allen).—The price you mention would not include cost of labour?—Well, labour is very cheap.

43. Q. (Mr. Muir-Mackenzie).—The cultivator does it himself?—Yes.

44. Q. You say Saran is not so dependent as other tracts on canals; is that a well established fact?—That is my own experience, which is confined to the Eastern Sone Canal; the area under my management, that was watered by the canal, was entirely dependent on irrigation.

45. Q. And would not have been previous to the introduction of the canal?—It always was irrigated by some means which the Sone Canal was in substitution for.

46. Q. Saran was not previously irrigated by such means?—Saran generally is not irrigated.

47. Q. (Mr. Rajaratna Mudaliar).—How many wells has the Raj constructed in the past ten years?—I cannot tell you; my experience of the Raj only dates from six months ago.

48. Q. (Mr. Muir-Mackenzie).—How many have you made in your time?—I have sanctioned 50 to 60, as many as I can push through.

49. Q. Do you hope to get through a hundred a year?—More.

50. Q. Would you hope to double the number of wells within a reasonable period?—I have not yet been able to acquaint myself thoroughly with the conditions of the Raj. I cannot say. I can imagine it to be possible.

51. Q. Within how long a period—20 years?—I hope in 10 years.

52. Q. If a similar energetic policy were pursued, could that be done in other parts in Saran?—The conditions are not the same. The Hatwa Raj is doing them for nothing. Proprietors elsewhere are not in a position to pay for wells like Hatwa.

53. Q. The Raj are making the wells purely from beneficence?—Yes.

54. If it was a matter of paying, could wells be doubled in your Raj merely to pay?—It would pay the rayat, not the proprietor.

55. Q. (Mr. Rajaratna Mudaliar).—The Raj does not expect to make any profit out of these wells?—No.

56. Q. Would there not be some indirect gain in the shape of certainty of rent?—Yes, to a certain extent undoubtedly.

57. Q. What is the rate of rent on such lands?—The average rate of rent is about Rs. 3-8 per *bigha*.

58. Q. Why do you prefer the District Board to the professional departments?—Because it is on the spot; the District Board represents all the interests of the district.

59. Q. The gentlemen of the District Board can even now represent their wants to the Canal Department?—Yes, but it takes six months.

60. Q. If there is a special Executive Engineer in charge of the works?—Certainly, at present it takes too long.

61. Q. If that delay were avoided, would you still prefer the management of the District Board?—Yes, it would be freer from the red tape that has been necessarily introduced.

62. Q. Do you think the management would be less expensive?—I don't think it would be less costly. I think it would be better to begin afresh.

63. Q. On what grounds would you levy a cess on the whole district and not simply on the area commanded?—I think the whole area is commanded.

64. Q. But some portions will get greater benefit than others; won't they?—Yes, to some extent, it is so very hard to arrange for the collection of a water-rate. It would be very difficult to discriminate between area irrigated and that indirectly benefited. It might be done.

65. Q. Would it not be just to do it?—It would be as well if it were possible.

Mr. J. D.
Macgregor.

28 Oct. 02.

WITNESS No. 28.—MR. J. D. MACGREGOR, Arrowah Concern, Chupra.

1. Q. (The President).—Are you a resident of Saran?—Yes, I have been here for 30 years.

2. Q. What part of the country are you in?—The south-east.

3. Q. You have just now heard what Mr. Ogilvy said; do you agree generally with him?—Yes, except in some points.

4. Q. Where do you differ?—With regard to the District Board undertaking the whole thing, I think it would be better that they should be made from Imperial.

5. Q. Do you mean on first construction?—Yes, it might be too large a business for the District Board.

6. Q. Do you agree with him in thinking that, after the works were put in proper order, that the Board might keep them going?—Yes, certainly; having been put in order they should be made over to the Board.

7. Q. On what other points do you differ from Mr. Ogilvy?—I happen to be best acquainted with the south-east part of the district where conditions, both as to soil and natural conformation of the country, are different from the north-west or Hatwa Raj side.

8. Q. What other variations would you desire to meet the conditions of the south-east corner—extension of the Saran Canals?—We have sufficient wells in that part; these wells are of very little use in dry years unless helped by sub-soil drainage which is benefited by the Saran Canals. I find from my own local experience that when these canals are running, water in the wells is 16 to 18 feet from the surface.

9. Q. What is the depth of the spring level when there is no canal?—20 to 25 feet.

10. Q. You said in dry seasons you could not trust to wells; do they run dry?—Yes, completely dry.

11. Q. Have experiments been made to dig them deeper?—Yes, but they silt in promptly; the sub-soil being sand.

12. Q. Are you talking of *pakka* or *kachcha* wells?—Both; the sub-soil is pure sand.

13. Q. You never irrigated rice from the wells?—No, it is impossible.

14. Q. Is this south-east corner generally rice country?—No, it produces mostly the richer crops—potatoes and *rabi*, &c.

15. Q. Do these four canals supply water for the *rabi*?—Yes, and for whatever rice we have.

16. Q. When the canals were in proper working order, did they run all the year round?—Yes, nearly.

17. Q. Are there any other points you would like to bring before us?—No, I agree generally with what the other witnesses have said.

18. Q. What do you feel about the cess? Would there be a strong feeling against it?—There is a strong sentiment in favour of it; very few would object to the cess.

Mr. J. D. Macgregor.

28 Oct. 02.

WITNESS NO. 29.—MR. T. R. FILGATE, lately of Burhooli Concom.

1. Q. (The President.)—Have you had long experience of Saran?—I have been connected with the factory for the last 13 years and I have had personal experience in North Bihar for 26 years.

2. Q. You have just heard the evidence of Mr. Macgregor and Mr. Ogilvy; do you agree with them?—Yes, generally. With regard to the Saran Canals, you have a considerable amount of water that is now running to waste, with a small expenditure on the present system the water could be utilized; you could fill the *chaurs* (which are natural reservoirs) and raise the water level of the district; this is really required not as a remunerative work, for that it could never be, but as a protective work in times of scarcity. In the first instance, relief charges have to be met by the District Board. In 1896-97 10 lakhs were spent in Saran which the District Board could not meet. At a conference held in Sonapur on the 20th of November 1896 Sir Alexander Mackenzie, presiding as Lieutenant-Governor, said it would be perfectly impossible for the District Board to meet that expenditure. Mr. Finucane estimated that, by the 31st of March 1897, 3 lakhs would have to be spent in Saran, and so the Lieutenant-Governor said this would have to come out of Imperial funds. In Saran once in 4 to 5 years there is scarcity owing to failure of rainfall, and the change proposed would be one or one and-a-half lakhs to be spent in relief. There was not much spent by the District Board in 1896-97; they spent all their available funds on roads and tanks. The general opinion in Saran is that money spent on roads and tanks is unnecessary. Tanks are made as a famine work; these immediately after the famine are left alone and silt up, so that when they are wanted they are dry. The roads are in good order and there are no more now roads on which money could be spent. It was placed on record at the conference that money could be usefully spent in making distributaries of the canals, provided that arrangements are made for keeping water in the existing channels.

3. Q. Would the District Board like the work to be carried out at once, or wait till a drought occurred?—If it could be arranged that the District Board should apply to Government for a loan to make certain improvements in the head-works and certain weirs in the streams, not a very large sum, the money could be availed of at the present time. A cess would pay not only for the interest on that money but a cess, on the whole district, on the basis of the embankment cess, would also provide for a sinking fund for what is to be raised. This would probably be Rs. 50,000. The District Board are perfectly well able to carry out maintenance, because the District Engineer in this district is supervised by the Superintending Engineer of the Public Works Department; the District Board under expert supervision could certainly carry out any work that was necessary.

4. Q. Would you like the District Board to carry out the preliminary work of putting these canals in good order?—Certainly.

5. Q. Rather than the Public Works machinery?—Certainly, I think under supervision.

6. Q. You heard what Mr. Macgregor said that it might be beyond the resources of the District Board?—I don't think so.

7. Q. Do you think that the district would accept the burden of this additional cess in consideration of the advantages to be gained by protection?—I certainly think they would, they pay an embankment cess which protects them one year in four; the same thing would apply here with regard to water.

8. Q. (Sir Thomas Higham.)—Did you say the supply often failed; and that once in every four or five years you require 1 or 1½ lakhs to be spent on relief?—Yes, perhaps more.

9. Q. Have you been spending 1½ lakhs every four or five years in the past 20 years?—I have been connected with this part only during the past 10 years. In 1890-97, when the severity was as severe as we are likely to have it, 10 to 11 lakhs were spent. In 1892-93 also a large sum was spent.

10. Q. (The President.)—In 1896-97 Imperial funds were given?—Yes.

11. Q. (Mr. Muir-Mackenzie.)—You had to contribute one lakh?—No, nothing, one lakh was put apart, but was not spent by the District Board.

12. Q. (Sir Thomas Higham.)—Have you any idea what loan would be required to put these works into order?—I could not possibly say definitely at the present moment. I should say something like 3 lakhs of rupees borrowed by the District Board would make certain distributaries and do what was necessary at the head.

13. Q. Do you think the amount required to pay interest on that loan and to cover all the working expenses should be recovered in the form of a cess?—Yes.

14. Q. Would that not be a very heavy charge?—No.

15. Q. Last year in Bengal the rates charged for water were not enough to cover the rates of interest and working expenses. Would not the cess be very heavy?—No.

16. Q. (The President.)—Colonel Hoddling said yesterday that a cess of 2 pies in the rupee would produce Rs. 50,000.

17. Q. (Sir Thomas Higham.)—I suppose this cess could only be imposed by the majority of the landowners?—No, I think it could be imposed in the same way as the embankment cess; or, perhaps, it would come under the Drainage Act; I don't know for certain.

18. Q. (The President.)—I presume it would want legislation?—Yes, I presume it would.

19. Q. (Mr. Muir-Mackenzie.)—Is there any room for the extension of well irrigation?—Not in my end of the district; that is in Barnoli factory on the Gangri.

20. Q. The soil there is not suitable?—It is suitable, but you can do so little with a well in the case of failure of rain; when you get in your cold weather sowings you can assist, but if there is no mois-

Mr. T. R. Filgate.

28th Oct. 02.

Mr. T. R. Filgate. ture, nothing can be done; it would be useful for subsequent watering.

21. Q. Could wells not be more usefully constructed if you had an improved canal system?—I have no doubt wells would increase, because the water level would be raised. At present wells are not very deep, and when the rains fail and there is no water in the rivers, most of the wells are dry.

22. Q. When wells are made, are they made by zamindars or rayats?—Mostly by the rayats and not very largely. I had experience of very few in 1896-97. I was authorized by the Collector to give advances for wells. In 1896-97 there was only one case in which they applied for money for a well; four men jointly liable applied; this was a fairly big well; it was capable of preserving 5 to 6 bighas of crops; but there was not sufficient water in the well to raise a crop in the first instance.

23. Q. Were any of Mr. Tytler's wells in your part?—A few; they were principally to grow opium.

24. Q. They were made by very carefully selected men?—I should say so. With the permission of the President the witness made the following statement:—“As regards Saran, I don't think that sufficient use is made there of the existing sluices in the embankment; there are sluices letting in water from the Gogra and Gandak; these were provided by the Public Works Department and naturally they have done their part of the business. It was for the people of the district to make distributaries and carry the water to the *chaur*s; this has not been done. In some places I have personal knowledge of a good deal of rice being saved; in my own part the big *chaur*s were

perfectly dry. In Chapra the Collector let in water and raised a 14 or 15-anna crop; the same thing happened on the Gandak embankment; the Collector went there and opened a sluice and where water was got into the *chaur* the *dén* was very good. One difficulty is that along these rivers a high bank intervenes between the river and rice land; along the high bank where the land is good at the time when water is required for the rice there is a maize crop in the ground; very naturally the man possessing a maize crop objects to any water going over his land to save the rice crop inside. If distributaries were made along the bank, you could get a great deal of water into the *chaur* inside.” Numerous *chaur*s could be filled in this way from rivers.

25. Q. Are there a great number of these sluices?—I am not sure; the Superintending Engineer could say.

26. Q. What is the size?—Some of them are 6 to 10 feet wide.

27. Q. Who are these sluices under?—The Public Works Department.

[Mr. Grouse in conversation with the President gave some details of these sluices and explained that the difficulty was to get them opened at the right time owing to the absence of the officer.]

28. Q. (Mr. Muir-Mackenzie.)—You said that the tanks which were made in the famine were useless, because they were not cleaned out but left to sit up; could they have been made any use of if they were properly looked after?—Very little; perhaps only to water cattle.

WITNESS No. 80.—MR. G. P. SIMKINS, District Engineer, Saran.

Mr. G. P. Simkins. 1. Q. (The President.)—How long have you been District Engineer here?—From the 3rd June 1897.

23 Oct. 02. 2. Q. Can you give us any information about the sluices?—They are primarily for drainage of *chaur*s after the river has fallen.

3. Q. How are they worked?—With the old screw.

4. Q. They merely begin to act when the floods are going down?—Yes. I have never seen them used for drainage or any other purpose except once.

5. Q. Have you anything you would like to call our attention to with regard to these canals?—I think, as a protective measure, they are most valuable; we have a very bad rainfall in the district and suffer very much from scarcity. They could be utilized to give moisture in years of drought.

6. Q. There must be a large amount of silt?—That will tend to make them ultimately high level canals and enable us to work better in future.

7. Q. Have you any idea, roughly, what it would cost to put this system of canals into proper working order. Mr. Filgate said 3 lakhs?—Yes, 3 to 4 lakhs would give a fair scheme.

8. Q. Then there would be maintenance charges?—That would be Rs. 20,000 to Rs. 80,000.

9. Q. Would they be quite within the power of the District Board to manage?—I think it would be better if original works were carried out by Public Works Department; they have better facilities and training.

10. Q. And the maintenance should be left to the District Board?—Yes; we could do the maintenance.

11. Q. From your knowledge of the district do you think the people would resent a cess to cover these charges?—They would like it. I have spoken to them about it and they said they don't mind a cess like the road cess; but they will not pay a water-rate.

12. Q. (Sir Thomas Higham.)—What about the Jharai? If the Jharai were brought into the scheme, it would be a useful thing; it would water a considerable tract of country, both north and south.

13. Q. There is a trough?—There is a high tract running between Bahsi and Jharai. You would have to raise the level of the Jharai and so get water there.

14. Q. What is the total area that would be commanded?—Probably 120,000 to 150,000 acres in the whole district (conversation over map). If the Jharai were included, it could irrigate 40,000 to 50,000 acres more than at present.

15. Q. How do you arrive at that?—From what I have seen of the district and the country that could be irrigated.

WITNESS No. 81.—MR. H. E. ABBOTT, Indigo Planter, Muzaffarpur, Tirhoot.

Mr. H. E. Abbott. 1. Q. (The President.)—How long have you been resident of this part of the world?—40 years.

23 Oct. 02. 2. Q. As what?—Indigo planter and manager of zamindari.

3. Q. Have you ever seen famine in the district?—I have seen five famines: it was very bad in 1861.

4. Q. Did you see the 1873-74 famine?—Yes, that was a made famine.

5. Q. Is the district in a better situation to face famine now than it was before?—In one way, railways have opened up the country and assured the bringing in of grain. In Sir Richard Temple's time transporting grain to the north was an impossibility, as the bullocks that carried it up ate it all. Now you can lay the grain at the doors of the people.

6. Q. What measures would you advise to effect protection against famine in Muzaffarpur?—Controlling the rivers to start with on the American system; banking up the Bhagmati which is a dangerous river. I think the

stopping of inundation would be far more desirable for the country than irrigation.

7. Q. That of course is rather outside our field. Our Commission have really to enquire how far irrigation could help?—I think it can help a great deal. Let channels be opened up; there is no doubt that a system of reservoirs in the way of tanks would be of enormous value. The great difficulty that we have to contend with is a poor population of tenants and a still more impoverished lot of zamindars. There is not a single banker with big money behind him.

8. Q. Is there much irrigation in Muzaffarpur?—No.

9. Q. Are there pines?—They have silted up, because the zamindars have not forced a periodical cleaning out by their rayats.

10. Q. Assuming that artificial irrigation were introduced into the district, would it be availed of every year?—Land in this part of the world is exceptionally capricious. When once you irrigate a field, that field gets obstinate,

and it will not grow a cold-weather crop again without irrigation.

11. Q. Is there a wish for irrigation in the district?—It is difficult to say. The rayats would like everything if they could get it for nothing.

12. Is there much well irrigation?—To a certain extent by men who grow poppy and *chena*, and now that this new scheme is being put forward under the management of Mr. Rowland Hindson, I think we shall see it used for sugarcane which seems likely to be the future staple crop of Tirhoot.

13. Q. It will require well irrigation; will it not?—Well irrigation will draw "Rao" where it exists to the surface and it may benefit the standing crop, but that is only where the sulphate of soda is not in too excessive quantities. Mr. Tytler found that where poppy was sown, and there was sulphate of soda in the soil, well irrigation drew it out.

14. Do people avail themselves of the advantage of making wells?—The expense is too great for one cultivator. As a rule, one will not take the loan, and it is difficult to get three or four to combine. Occasionally a well is dug on an auspicious occasion—a marriage or something of that sort.

15. Q. (Sir Thomas Higham.)—You will require more extensive irrigation?—When they begin to cultivate from it irrigation must be an enormous advantage. It means safety instead of a toss up. Cane can be grown without irrigation in strong soils.

16. Q. Any extension of irrigation in the way of small canals should be done by means of a loan to the District Board?—Yes.

17. Q. Recovered in the form of a cess?—Yes. That is the only way. Mr. H. E. Abbott.

18. Q. Would the cess be accepted generally throughout the district?—Yes. *Sirkar ka hukum* is still accepted humbly in these parts, I am glad to say. 28 Oct. 02.

19. Q. (Mr. Muir-Mackenzie.)—Mr. Tytler in the paper he furnished narrates how he advanced Rs. 1,48,000 for wells to cultivators whom he induced to combine. If any person took up the work as his sole duty, could he do the same?—Yes, and a Government official would have ten times the weight of a non-official.

20. Q. There are plenty of lands suitable for such an extension in this district?—Yes; it is different from Saran, which is sandy. This soil holds its moisture fairly well, and with 50 or 60 inches of rain the crops are fairly safe.

21. Q. Would such an extension be possible in this district?—I doubt it. In Tirhoot any extension would not be much.

22. Q. (Mr. Rajaratna Mudaliar.)—Could any facilities be afforded by advancing loans at a cheaper rate of interest?—The cheaper the rate the more rayats are likely to take advantage of them.

23. Q. Is an extension of the term from 20 to 30 years desirable?—Certainly; more would be likely to apply.

24. Q. Ought not some difference to be made in the cess between one man getting a direct benefit and another getting only an indirect advantage?—That might be left to the officers of the district. Certainly, it is just.

WITNESS No. 32.—Mr. G. W. DIXON, District Engineer of Muzaffarpur.

Note on the proposed Bagmutty Canal.

The scheme as proposed by Mr. Mills was for a channel some 10 miles in length, strongly protected at its head work and at the inlets and outfalls of the nasies or water-courses crossed, to convey water in seasons of drought from the Bagmutty river, where there is an ample supply, and lead it into the Purandhar and Lakhndye rivers which would act as distributing channels and from which irrigation is habitually carried out, either by flooding the adjacent *chauras* or natural depressions in the country or by lifting the water for the irrigation of land close to. There is a regular system of *pains* or irrigation channels constructed by the *mulkis* from the river Lakhndye, in some cases running for miles inland. Work was commenced on the excavation of this channel during the famine of 1897, but not completed. It was proposed merely as a scheme to provide for the irrigation of *rabi* and dry weather crops in times of drought and would be most useful for this purpose. The cost is estimated by Mr. Butler at Rs. 3,95,762, say, Rs. 3,00,000 exclusive of establishment and other charges. The length of the Purandhar and Lakhndye rivers, measured along their courses, from which water could be utilized for irrigation purposes, is some 90 and 60 miles respectively, and assuming that a tract of country 2 miles in width on each side would be more or less benefited, the area works out to 600 square miles or 3,84,000 acres. The Collector of the District (Mr. Chapman) in his report on the subject dated

estimated this as 300 square miles, which is practically identical, excluding the Purandhar. (The area served by the Lakhndye I calculate as $90 \times 4 = 360$ square miles.) Mr. Butler in his report assumes that the High Level Canal with distributaries would command 210 square miles of country and bases his financial calculations on irrigating 103,000 acres. Mr. Mackenzie, the Manager of Rajkhand Factory, situated on the Lakhndye and who regularly irrigates from it, estimates the cost of bunding the river and running water down through existing *pains* at half an anna a bigha (= 8 acre). Bunds are generally made at intervals of some 10 miles apart, but could with a good water-supply be done at less than half of this. Taking the existing circumstances and the area served by each bund, as stated by Mr. Mackenzie at 4,000 *bighas*, the Lakhndye river may be assumed under existing circumstances to irrigate $90 \div 10 \times 4,000 = 36,000$ *bighas* or 29,034 acres, or at 5 miles intervals 63,108 acres. The two rivers combined, if a sufficient water-supply be provided, would distribute sufficient for $90 + 60 = 150$. $150 \div 5 = 30$ bunds = $30 \times 4,000 = 120,000$ *bighas* = 96,845 acres. This is, I believe, an underestimate, but is based on

Mr. Mackenzie's experience. The interest on capital cost at 4 per cent. would amount to Rs. 12,000 per annum and if 50,000 acres or less than 1/7th of the tract served (viz., 384,000 acres) were assessed at 4 annas per acre, the income would amount to Rs. 12,500. In order to regulate the rivers and the water-supply they would have to be brought under an Act somewhat similar to the Bengal Sanitary Drainage Act, which provides for an assessment on the area benefited. Mr. Toogood in paragraph 7 of his report forwarding the estimate states that "for *rabi* and hot weather irrigation the canal can be fed and water relied on." This is all that was claimed in the scheme. In very dry seasons the water in the Purandhar and Lakhndye rivers is intercepted by bunds high up their courses, frequently outside British territory, whereas there is a constant supply in the Bagmutty which runs to waste. If a small portion of this were run into the *chauras*, it would not only allow of the cultivation of much *rabi* and hot weather crops as well as the early sowing of rice for seedlings, but would also appreciably raise the water level of the surrounding country.

2. In the foregoing paragraph the arguments in favour of the scheme as proposed by Mr. Mills are briefly detailed. In 1898, the year following the famine, Mr. Butler was deputed to investigate the subject and to submit detailed estimates. Its characteristics were altered from that of the provision of a water-supply to augment existing and established local irrigation to that of a high level canal from which the water would be supplied by gravitation, along with the necessary distributaries and adjuncts, which he estimated to cost some Rs. 4,00,000 more (exclusive of establishment charges). This provides for the irrigation of the *kharif* crop in October in the event of a failure of the rains. From the deductions drawn by Mr. Toogood from rainfall statistics of the Sitamathi Sub-division water would be required for 1 year in 4, or 2 years in 5 for a full crop return. It is further stated, and this is an uncontroversial fact that, without a weir across the Bagmutty river, the result (in October) would be problematical. Moreover, the site is one eminently unfitting for the construction of a work of this description.

3. From the evidence before me and my local knowledge I am of opinion that a High Level Canal such as last proposed is unreal for by the circumstances of the case and nearly impracticable. Mr. Mill's original scheme alone remains to be considered. It has much to recommend it as it provides for the utilization of water which runs to waste during seasons of drought, and which is worth gold, but it is one that, owing to the easterly trend

Mr. G. M. Disney.

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Mr. G. W. Disney. of the Bagmutty river, and the action of the recent flood on the Sitamarhi Dheng branch of the Tirhoot State railway will have to be very carefully worked out and ample provision made for the spill of flood water, when such is necessary, with this in view I had the excavated sections made into elongated embanked tanks, while the work was in progress.

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4. The figures given by me as regards probable balance between Income and Expenditure are merely very approximate. These would have to be carefully verified. The estimated cost of so far completing the work as to make it of use would probably be—

	Rs.
Head sluice	19,381
Tail weir	17,838
Bridges	3,936
Earthwork	83,673
Land, 297·8 acres at Rs. 175 . . .	52,116
	<hr/> 1,76,943

(Interest on estimated cost, say, Rs. 1,77,000 at 4 per cent.=Rs. 7,080 per annum.)

Deduct value of work done during famine—

	Rs.	Rs.
Earthwork	30,395	
Land acquired	22,250	
	<hr/> 52,645	
		<hr/> 1,24,298
say		1,25,000

(Interest on balance of estimated cost, Rs. 1,25,000 at 4 per cent.=Rs. 5,000 per annum.)

5. The main advantage of the scheme is, in my opinion, that it admits of the filling of many *chaurs* in the country, thus keeping up the water level during seasons of drought. It will therefore benefit a larger area than that actually affected by surface irrigation.

Irrigation and the filling of *chaurs*.

The great want of North Bihar is a means of filling up the *chaurs* or natural reservoirs of the country during seasons of drought. There is ample water available, but this, as a rule, runs to waste in the rivers owing to there being no organized means of its utilization.

In order to arrive at a conception of existing circumstances it must be recognised that, in order to save lands from being flooded while the rivers were high, marginal embankments have from time to time been constructed, the consequence being that the river-beds have been raised by the deposit of silt, and have become to some extent high level canals with no fully developed means of conveying the water from them. There are sluices in the Gandak and Turkey embankments in this district, but there is much scope for the excavation of locally called *pains*, or distributing channels from them. In the private bunds along the Mur Gandak and Bagmutty rivers I have not seen any attempts made at this. Owing to the above facts many of the *chaurs* are only filled up either by a heavy local rainfall, or when the bunds burst during flood time. Moreover, many *chaurs* could be filled by judiciously made channels from the rivers, the inlets to these being protected by sluices. This, in addition to the direct gain to land irrigated, would be of great service in raising the water level of the vicinity.

What I take it as required in order to provide for the water, which is now wasted being made available in seasons of drought, is some less elaborate system of irrigation than that of a high level and expensive canal which is, in my opinion, not necessary in districts similar to this with an average annual rainfall of over 45 inches; merely inexpensive channels leading the water direct to the *chaurs* would suffice, the cost of making and maintaining these being met by a contribution or cess from the lands benefited. This might probably be arranged for by enlarging the scope of the Bengal Sanitary Drainage Act No. VIII of 1895 which makes provision for the conservancy of rivers, if not provided for in any other Act.

1. Q. (The President.)—Have you been long here?—Nearly 18 years.

2. Q. Have you had anything to do with the preparation of these schemes for the north part of the district?—Indirectly from time to time. The Bagmutty Canal is the principal one.

3. Q. You propose to improve the irrigation by bringing the supply now existing from a more certain source?—Yes.

4. Q. Have you been here through a famine?—Three—1893, 1892 and 1897. They were, rather, scarcities. It was never intense famine. In 1888 the expenditure was over Rs. 2,39,000, in 1892 Rs. 98,000 and in 1896-97 Rs. 15,21,000 in this district alone. Taking the 18 years the average is over a lakh a year.

5. Q. What measure would you suggest for protecting it against future famines?—The utilization of the existing water, as far as possible, is the only thing, and the opening out and making of *pains* or irrigation channels and sluices protecting these.

6. Q. Are there many *pains* as it is?—Not many in this district. Most rivers have been bunded along the margin from time to time, thus preventing the water from getting into the *chaurs*. These are now dry in the dry weather and the water level goes down.

7. Q. Were these *chaurs* formerly rice fields?—Yes, and are to a certain extent still.

8. Q. Does not the district want water five years out of six?—Four out of five, probably.

9. Q. If there were a complete system of irrigation here, would it be availed of every year?—I do not think so.

10. Q. I suppose irrigation has only occupied a small portion of your time?—Yes.

11. Q. (Sir Thomas Higham.)—The Bagmutty scheme is of small value for irrigating the *kharif* crop?—Yes. I recommend that the cut made in the famine be completed.

12. Q. Your idea is that this should be a district work and the amount recovered by a cess?—Yes.

13. Q. If there is only a small supply of water, the first comers would get it, I suppose?—There would have to be a series of by-passes. The river would have to be divided into sections by *bunds* and the water passed down to each in turn. The river might be bunded in the hot weather. It is 500 feet between the banks.

14. Q. Any other scheme for this district?—The other schemes are for cutting *pains* in the existing embankment to feed the *chaurs*. There are numerous embankments in the river which shut out the water from the *chaurs*.

15. Q. Are these *pains* private ones?—A few private ones.

16. Q. Where do they get the water from?—By bunding the river.

17. Q. The cost would be great?—The main Bagmutty scheme would be heavy, but the other works would not be costly.

18. Q. There is flooding from the Bagmutty; is there not?—Yes; this year it came down through Durbhanga and Sitamarhi. It cannot be stopped, because it comes from Nepalese territory.

19. Q. It is the cause of much damage to crops?—A good deal of temporary damage, but this is more than recompensed for by the silt that is brought down by the Bagmutty and which improves the land.

20. Q. That protection from floods is more important than providing for irrigation?—No.

21. Q. (Mr. Muir-Mackenzie.)—Out of those 18 lakhs spent how much came out of the funds of the District Board?—I believe a lakh and-a-half, roughly.

22. Q. If all the schemes you have suggested—the canals from the Bagmutty and the opening out of sluices—were adopted, how large a proportion of the area would be protected?—I calculate the first would do six hundred square miles. I should have to work out the rest. I may put it at four hundred square miles; that is, a total of 1,000 square miles or a third of the district.

23. Q. That would not obviate the necessity of famine relief being given in the remaining two-thirds. That

is all that could be done? How about well irrigation?—Well irrigation seems to bring the cost up to such a tremendous amount.

24. Q. I see you want 128 lakhs to protect $\frac{1}{3}$ rd of the district entirely, with one well for each ten acres for one thousand square miles. Even supposing money was forthcoming, would it be possible to get a well for each ten acres in the district?—So far as natural characteristics go, I should say quite possible.

25. Q. Do you consider that the famine work undertaken in the scarcity of 1896-97 was as useful as could be devised?—I think under the circumstances yes.

26. Q. If you had more time to think it out, could you have improved them?—The difficulty of famine relief work is in completing it. It would not be advisable here to make a *pain* to a river and leave the mouth open; you want to make a sluice to control it, and if you go in for a very large provision of *pains*, it means a lot of money for permanent improvements.

27. Q. Did you open out *pains* largely?—There is a certain amount done; I should like to see more done.

28. Q. Have you anything to do with the famine programmes?—Yes. I have got a large survey made recently for the improvement of a river, the Bya in this respect. I should like to have further surveys for suitable famine relief work.

29. Q. What is that?—It is the Bya river in the southwest and south of the district.

30. Q. That would require a certain amount of expenditure on head-works?—Yes, considerable.

31. Q. It was in anticipation of famine?—Yes, when the rains held off last year. Mr. G. W. Disney.

32. Q. But do you think these *pains* so valuable that you would like to see them started as works of importance before any famine was apprehended?—Yes. 28 Oct. 02.

33. Q. What extent of country would they irrigate?—From the Bya river about two hundred square miles perhaps.

34. Q. What other work was done in the famine besides making roads?—A good number of tanks were dug.

35. Q. Would it be possible to replace all these works by works useful for irrigation?—No; only a small proportion. The sectional area of a *pain* is so small that labour would be distributed along it and would be unmanageable.

36. Q. The country is not suited for *ahars*?—Yes, in Sitamarhi, where the grades are steeper.

37. Q. Are they suitable for famine works?—No, they are too small.

38. Q. (Mr. Rajaratna Mudaliar.)—Would zamindars be inclined to construct some of these *pains*?—I cannot give you an opinion on that.

39. Q. Could the cutting that was made in the last famine, the Bagmati Canal, be utilised for the completion of the work?—Yes, it is not filled up to any great extent.

40. Q. What was the amount spent on that cutting in the famine?—Rs. 30,000 spent on work and Rs. 22,000 spent on the acquisition of land.

41. Q. So to that extent the cost of the work would be reduced?—Yes.

WITNESS No. 33.—MR. M. H. MACKENZIE, Planter of Tirhoot.

1. Q. (The President.)—How long have you known this district?—I have been here about 25 years.

2. Q. What part do you know best?—The Sitamarhi Sub-division.

3. Q. What schemes would you advocate for helping it through another famine?—Where I am the Lakandai river runs throughout the whole country, and there is a system of bunding the river at intervals; the overflow of the water is allowed to pass on to the land by means of small cuttings from the banks to the river; and any scheme which would tend towards improving the existing arrangements would be practically all that is necessary.

4. Q. Is irrigation necessary for the crops?—In hardly any year do they do without irrigation to help on the rice to insure it.

5. Q. Does the damming of the river create disputes among the zamindars and cultivators?—No; the system is pretty well recognised. But the bunding should be regulated, so that those lower down the river should be given an ample supply of water by passing it on. Enormous masses of water run to waste in the *chairs* at present. There should be side channels laid out with sluices.

6. Q. I suppose the present irrigators would claim vested rights. Probably those at the upper end of the river get a far larger share of the water than those below?—It is not so much what they use. There is ample water with a proper use of it. The Bagmati with a proper scheme would give an ample supply right down through its whole course.

7. Q. Would you allow new *bunds* and new *pains*?—It is difficult to say what is new and what is old. A *bund* has always to be made on a different site every year because the rush of water scours away the site.

8. Q. Is there enough water in the river for that?—In a year like this there would have been sufficient, but in the

famine year of 1896-97 the water was short. There was a *bund* in that year and there was opposition to cutting it, and the bed of the river was absolutely dry. Above, too, there was not a full supply, because the water was run to waste. Mr. M. H. Mackenzie.

9. Q. Would you require a responsible overseer to be put in charge to see that the water was properly disposed of?—There would have to be some control. 28 Oct. 02.

10. Q. And a certain amount of outlay. Would the district bear it?—A very light cess would cover the cost of such works as I propose.

11. Q. The general conclusion in the Saran evidence was that it would be desirable that the existing system of canals should be put into really good working order at the expense of the District Board by whom a loan would be made, and they would repay it by a cess?—No moderate cess would be objected to if there was a corresponding benefit.

12. Q. (Mr. Muir-Mackenzie.)—Is the river sufficiently embanked at present?—In most places where it overflows they have thrown up banks: that is, on the Lakandai.

13. Q. (Mr. Allen.)—The *bunds* in the Lakandai simply act as weirs; the water passes over them?—No.

14. Q. Well, what happens to the lower *bunds*? How do they get any water at all?—That is what I complain about. The water should run back into the river.

15. Q. Then so long as upper *bunds* last lower *bunds* get no water?—Practically.

16. Q. But if the Bagmati were thrown into the Lakandai, what would be the effect?—If too much were thrown down, it would make the side channels still more essential.

17. Q. What would be the area that this Bagmati scheme would assist?—It would give a good supply of water to the whole length of the Lakandai.

18. Q. How many *bunds* are there in the Lakhandye?—They vary; seven or eight perhaps.

WITNESS No. 34.—MR. ROWLAND HUDSON, Planter of Tirhoot.

1. Q. (The President.)—How long have you known this part of the country?—Since 1872 Tirhoot and Champaran.

2. Q. Is sugar much grown in Tirhoot?—Yes.

3. Q. With well irrigation?—As a rule, without irrigation.

4. Q. I suppose it is essentially a crop which would be improved by steady irrigation?—Yes.

Ben.

5. Q. Would the water be taken every year?—Almost every year water should be used in February and March and probably up to July. Mr. Rowland Hudson.

6. Q. Does the success of the enterprise depend upon the introduction of irrigation?—No. Tirhoot, Champaran, Saran and Rungpur are the only districts in India in which sugarcane can be successfully grown without irrigation. The land in the above districts retains its moisture, prob-

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Mr.
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ably owing to its proximity to the hills. Irrigation will give an increase in the yield.

7. Q. Would you advocate irrigation as a protection against famine?—Certainly.

8. Q. What scheme would you propose?—The scheme proposed by Mr. Disney. He proposes putting sluices in the existing *bunds*, which were made to prevent river flood water from running over the country in uncontrolled quantities. High ridges on the watershed should also be cut through and sluices put in the cuttings. The effect would be practically unlimited. If you get water in one *chaur* by cutting through a narrow ridge, you may get it into another from it by the same process and so on. This in itself would do a great deal of good, but I think it should be supplemented by a scheme to raise the level of the rivers in dry seasons several feet. The ordinary *bunds* made for this purpose are open to the objections that they are swept away in flood time, and are very often the cause of disputes. Falling weirs would be permanent and much more effectual.

9. Q. Would you want to raise the beds of the rivers?—No.

10. Have you any idea where this is to be done?—In the little Gandak running right through Champaran and Tirhoot it would do a great deal of good, and in many smaller rivers nearer to the Nepal frontier.

11. Q. It would be an expensive work?—Yes, but it would be an insurance against having to spend an enormous amount to save the people in the event of a famine.

12. These weirs would necessarily be accompanied by distributary channels?—That would be a small matter. Existing water channels, which are empty in the dry season, could be utilised in many places.

13. Q. Would the people take water every year?—I think so. The average rainfall is about 45 inches, but a great deal depends on whether it is seasonable or not.

WITNESS No. 35.—BABU BISHWA NATH, Zamindar and Indigo Planter, Muzaffarpur.

Babu
Bishwa
Nath.

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1. Q. (The President.)—You have seen this district in time of scarcity?—Yes.

2. Q. What is the best policy to prevent the evil effects of famine?—Improved irrigation.

3. Q. How?—The lands in this district are of different kinds. Some are benefited by irrigation and some do not require it. If the irrigation is taken over by the district officer, so that people living along all parts of it are equally benefited, that part of the country will be quite sufficiently irrigated by the present sources. And where we have not got sources of irrigation, by excavating the tanks it will be sufficient, and a small tax will be required to be realised from those interested and that will pay for the small cost.

4. Q. Would you like to see the Government make more *pains*? Yes; sometimes *pains* are necessary and with sluice gates, because otherwise one man gets all the benefit of a *bund*. That is where we want control.

5. Q. Who is to exercise that control?—The district officer. But any big scheme is not desirable.

6. Q. Do you know the Bagmati scheme?—Yes. I think any more water rushing from a very big river to a river of a narrow channel will be sometimes very dangerous. It may do good in some years when there is no water in the river, but in some years it will be difficult to pass so much water.

7. Q. Would you tax each particular *pain*?—Yes.

8. Q. (Mr. Muir-Mackenzie.)—Is there any room for the extension of well irrigation?—A good deal more might

14. Q. It would make this difference that if money were laid out upon these schemes out of the existing local funds of the district, if they take water every year, a water rate can be put on?—Then it would be necessary to measure the water, and that would be a difficulty.

15. Q. Would not a cess create opposition?—I think it would be difficult to levy a cess which would be relatively fair. Rayats in certain areas would have to be assessed at similar rates, and some of them would derive more benefit from the scheme than others. For example, a rayat with a large holding would pay, say, one rupee a year; owing to the position of his holding he will be benefited to a great extent. The effect of the increase of the produce of his holding would be to lessen the value of the produce of a rayat who is less fortunate in the position of his holding and who would derive little or no benefit from the scheme, while the latter would also have to pay his water rate of one rupee. I should be inclined to carry out the scheme as an insurance against famine and out of the funds of the Imperial Treasury. We have a population of a thousand to the square miles here, and it would take a great deal of money to save the people in a famine year. I do not say that it would not be possible to levy a cess for up-keep; that would be infinitesimal, and I think cheerfully paid.

16. Q. Would sugarcane growers pay rates?—Yes.

17. Q. How much per acre?—I cannot say. Probably Rs. 5 or Rs. 6 for measured water.

18. Q. (Mr. Muir-Mackenzie.)—In the neighbourhood of Poona we demand Rs. 50. But then you cultivate very highly and get a very large outturn.

19. Q. What do you get per acre?—From the smaller varieties about 12 tons and from the larger from 15 to 25.

20. Q. (The President.)—Would you consider the advantage of irrigation? If canals were made, would you be inclined to grow sugar in the districts which would be irrigated by them, say, in Champaran?—No. I would not. Others might do so. I must work the properties in which I am interested. The country which would be benefited by the Tribeni Canal is essentially a rice country.

be done with Government advances returnable at ten or fifteen years; also for tanks.

9. Q. Are the tanks used for irrigation?—To some extent.

10. Q. (Mr. Bajaratna Mudaliar.)—Are the people anxious to take loans, and is there any difficulty in getting them?—Yes, they cannot get from private persons; and there is delay in getting loans from Government. Some special forms should be laid down for an officer for realising and distributing the amount by the officer going to the village himself and getting the loan from the man who owes it. Sending a *chaprasi* increases the burden of the loan.

11. Q. Do you think the district officer might advantageously disburse loans on the spot?—Yes.

12. Q. Would zamindars be able to disburse loans?—The Deputy Collectors will do it better than the zamindars.

13. Q. Are there any *pains* in your zamindari?—Yes some private ones; but up to this time none made specially for the benefit of the rayats.

14. Q. Is the *nakdi* system in force in your zamindari?—Yes, and in taxation particular attention should be paid to the fact. In a fixed area held on a fixed rent; if it yields a better crop, we do not get anything more; and if the cess is levied on revenue like the embankment cess, we shall have to pay for the benefit derived by those rayats.

15. Q. Don't they pay half?—They should.

16. Q. But suppose you execute improvements you have the power to enhance the rent?—It is lodged round with forms and restrictions.

WITNESS No. 36.—MR. A. T. CHRISTIAN, Sub-Deputy Opium Agent, Tirhoot.

Mr. A. T.
Christian.

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1. Q. (The President.)—You are Sub-Deputy Opium Agent in this district?—Yes.

2. Q. In the whole of Tirhoot?—Yes, Muzaffarpur and Durbhanga.

3. Q. That entails your travelling about a great deal among the people, and so you have been able to see their wants?—Yes.

4. Q. Have you been long in this district?—Since 1896.

5. Q. Were you here during the famine of 1896-97?—Yes.

6. Q. Do you find any strong desire expressed for artificial irrigation here?—In certain parts of the district where they irrigate they are very anxious to get well advances for the irrigation, but in other parts of the district they do not irrigate and depend on streams and *ahars* for irrigation; there they do not ask for well advances.

7. Q. If it were possible to introduce into this district an irrigation system, such as the Sone Canal, do you think the people would pay for it?—It would all depend on what they had to pay. If it was a small amount, I dare say they would willingly pay it and utilise the water.

8. Q. In places where they do not irrigate?—In some places I have introduced irrigation, and once they have taken to it they have kept on irrigation.

9. Q. Was that irrigation by wells?—Yes, we give advances for wells.

10. Q. You have done this on a very large scale; have you not?—Not on a very large scale always. The two seasons I gave rather largely were in 1896-97 and last year. In 1896-97, which was a dry year, I gave advances for 151 *pakka* wells, 41 old wells repaired and 1,254 *kachcha* wells. For all that Rs. 12,406 were given. The next year 1897-98 we gave advances for 110 new wells, 26 old wells repaired and six *kachcha* wells only. Altogether Rs. 5,242 were given in this way. Last year we gave advances for 56 new wells constructed, 113 old wells repaired and 931 *kachcha* wells. The total amount given was Rs. 7,879.

11. Q. When you give an advance for a well it is coupled with the condition that the man who takes the money will grow a certain amount of opium-poppy?—Yes; we only give advances to poppy cultivators. Some of them engage to give a little extra area sometimes. Suppose a man's well falls in and his well is made for irrigating poppy as well as other crops, then we give him an advance.

12. Q. Does he confine himself to poppy or does he grow other crops?—He grows other crops and he uses the well as well for the other crops. We generally give an advance to three or four cultivators together. They always use one well among three or four men, or sometimes more, according to the situation of the well. In Tirhoot they can irrigate about 10 acres round about one well, but not everywhere. In some places they cannot irrigate more than two or three acres; but where they do not require much water, only one or two waterings for the whole season, they can irrigate more.

13. Q. Have you been troubled with these wells running dry?—They very often run dry, and that is how we give advances for deepening wells.

14. Q. Do they deepen very freely?—That again depends. In certain parts they can do it freely, but in other parts where they have got quicksands below the surface, they require appliances to go through it. In some places they can sink them very easily.

15. Q. What does it cost?—Our average cost is about Rs. 50 to 60 per well.

16. Q. Is that the amount for a masonry well?—Well, it is not quite a masonry well. They simply use burnt bricks and they do not use any mortar. If they use mortar a well costs about Rs. 200. For the purposes of irrigation they have usually these inexpensive wells.

17. Q. (Mr. Muir-Mackenzie.)—What is the usual depth to the water source?—That also varies very much, but the average depth is from 20 to 40 feet.

18. Q. (The President.)—Do they grow poppy without irrigation?—Yes, we have got about 30,000 *bighas* here, and out of that we have a little less than $\frac{1}{2}$ irrigated; the rest, say about 19,000 *bighas*, is unirrigated. The proper area for this year is 28,600—about 17,000 acres. The total area altogether irrigated is about 8,000 acres and the rest is unirrigated. Out of the unirrigated area, however, although we call them unirrigated, they use water from the different streams, whenever they can get it. For instance, in the Madhubani Sub-division, although the cultivation is called unirrigated, they manage to get water every year nearly from some streams. 8,000 *bighas* are irrigated from wells; some of the other is not irrigated at all, and the rest is irrigated from streams, tanks and *chaurs*.

19. Q. Where they have wells do they use them freely every season?—In the parts we call irrigated cultivation they use them every year whether there is rainfall or not.

20. Q. With your knowledge of the district have you any suggestions to make as to how we might be better prepared for famine in Tirhoot?—I think we can improve well irrigation, and as regards the irrigation from streams, I had a talk with Mr. Mackenzie, and his proposal is exactly what I suggest, viz., the bunding up of the streams and giving water from *pains*, *chaurs*, etc.

21. Q. There is a great deal of that as it is?—Yes. In fact, I think quite six or seven thousand *bighas* of the unirrigated land are irrigated by the last means.

22. Q. (Mr. Muir-Mackenzie.)—The granting of advances for wells is by no means your only business?—No. That is only one part of it.

23. Q. Do you generally give your opium advances to tenants?—Yes, to all sorts of people: not only to occupancy tenants, but to any man who is brought forward as a genuine cultivator.

24. Q. What is the security?—Generally there is a middleman or *hathidar* who brings about 20 or 30 cultivators. These cultivators come to us jointly and say they want advances and we give it to them on their joint personal security.

25. Q. You don't take lands as security?—Only in cases of well advances. Then we take immoveable property as security.

26. Q. Do you always take immoveable property in cases of well advances?—Generally. There are special cases where three or four men come to us for advances and we give it to them on their joint security if they are good cultivators.

27. Q. Mr. Tytler employed that combination principle a great deal?—Yes, he used to do so more, because he had more occupancy tenants there, and there are more permanent cultivators in his district. We cannot do here that, because in dry seasons our cultivation fluctuates a great deal.

28. Q. (The President.)—What brings it down in a dry season? Is it want of rain?—Yes.

29. Q. Cannot wells replace the rain?—Generally the wells have a sufficient supply of water, but it is in places where there are no wells that the difficulty is felt, and they do not generally sink wells or construct wells here in places where they are not used to making wells. In some places again there are difficulties such as quicksands which cannot be got over. In other places they are not used to irrigation, and they have an idea that if they irrigate once, they will always have to irrigate. In some places again the cost is too much.

30. Q. What is the period for repayments of loans?—Within two and-a-half years from the date we advance them the money.

31. Q. Do they never ask for any longer periods?—Sometimes they do. Last year in several cases people asked for time and we gave them another six months and in rare cases we have given a year's time.

32. Q. Do you have any difficulty as regards repayment?—No. Failures to recover advances are very few and we very seldom have recourse to law.

33. Q. Do you think, if you allowed people a longer period to repay, they would be more forward in applying for advances?—I dare say they would; but so far as our department is concerned, we do not want to make money arrangements of that sort.

34. Q. What rate of interest do you charge?—No interest.

35. Q. When is a man's instalment paid? How soon after the advance to him?—A man to whom we advanced money this season will not pay back his first instalment till April 1904. Then the second instalment will fall due in September 1904 and the third one in April 1905. He pays back the money in three instalments, but then he does not have to pay back anything for one year.

36. Q. That gives him time to make his well and grow his crops?—Yes.

37. Q. I gather you have not succeeded in making wells popular in tracts where they used to be comparatively unknown before?—No. In parts of Darbhanga close to Samastipur we got a few cultivators to try. Where they did try and made wells, they kept to irrigation, but it is very difficult to get people to take to it in new places.

38. Q. In Samastipur has it spread in consequence of the action you have taken?—No. In only about 20 villages irrigation is used.

39. Q. In consequence of that has the example been copied?—No. There are only 20 villages to which it has been extended, but not more. That is nothing very much after all.

40. Q. Does well irrigation largely increase the yield of poppy?—Yes, it increases the yield much more than canal water does, I think, generally. That again all depends upon soil. In some places canal water does, but in places where the well water is brackish and soil indifferent, well water is more beneficial. Close about Hajipur they may

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have rain, but until they irrigate from wells they do not get a good crop of poppy or anything else: no garden produce.

41. Q. I suppose there is a great deal of manure used?—Yes, in poppy.

42. Q. Do you find that where you have encouraged well irrigation they generally get sufficient water for all operations from the sowing to the finish?—Usually they do, but there are some places where wells run dry. Some of these they can deepen and others they cannot, and so they have to do the best they can with their scanty supply.

43. Q. Some witnesses have said that where wells are dug you may get enough water for late watering of the crop, but that you cannot rely upon wells at cropping time?—That is the case in several villages. In irrigated tracts, a few miles south of Muzaffarpur, we have only got to go 20 feet and we can get a sufficient supply of water all the year round.

44. Q. And yet irrigation has not very much extended in that part?—In every village every bit of land is irrigated there.

45. Q. Is it your business to press the people to take well advances? Are you encouraged to press the people to take well advances?—No. They come of their own accord. We try and encourage well advances by encouraging them to come to us when they want them. We go to a village and see a well out of repair and we ask the man if he wants any help, but there is no need to persuade them at all. If they were pressed, they might not spend all the money in making wells.

46. Q. Does the amount advanced yearly vary very much? Are the number of applications the same, or are they very much increased by the amount of stimulus given by individual officers?—I think a great deal depends on the year. In the two dry years I had very many more applications than in other years. In years when they have a good rainfall people do not think of making new wells or repairing their old ones.

47. Q. Have you ever found your allotments insufficient?—In these two dry years I have had to ask for further sanction.

48. Q. Have you always been able to get your further sanction?—Yes. In 1897 I had to ask for three times the amount which was first allotted to me, which was Rs. 4,000.

49. Q. You could not have got rid of any more profitably that year?—I distributed it among poppy cultivators. I dare say, if I were to have advanced to other cultivators, we could have got rid of more. But we only restrict ourselves to poppy cultivators.

50. Q. You have had a lot of experience in advancing to cultivators. If you were employed to advance to other cultivators, don't you think you would get rid of a lot more money?—Yes. The people seem to have more confidence in us. They have not got to go through a lot of formality. In special cases they come and apply to us and our mohurrir makes enquiries when we are in camp and we pass through these villages, and the advance can be given within three or four days of the application.

51. Q. You are enabled to give advances very promptly?—Yes.

52. Q. Do you carry the money about with you?—In seasons of drought we do. As a rule, however, we first make enquiries. All applications are given in July, August and September. November to January is the time we make all our enquiries. In January we pay our first instalment and then we go on making enquiries and more advances are paid in March. Then we have got to pay them a second instalment. We do not pay all in one instalment. We pay the first instalment, and then when the man commences working we pay him his second instalment and the third when they are about finishing.

53. Q. Who goes about inspecting the work?—I inspect in the cold weather and my two assistants also inspect in the cold weather and our native staff makes enquiries about the security. These security enquiries naturally occupy about three or four days. There is very little difficulty about

security. The men are generally truthful, and thought does happen sometimes that we come across a dishonest man, my experience is that they are fairly honest, and they know that if they deceive us once they will never be able to show their faces to us again. I have recovered every piece of the advances with the exception of the instalments still due and for which the periods have been extended. We have seldom to have recourse to law to collect our money. They know that if they pay up promptly, they will get advances again when they want them.

54. Q. They do not often ask you for a postponement of payment of instalments?—They don't ask very often except when there is a dry season or when there is a bad season for opium.

55. Q. Do you grant it?—Generally it is granted. Of course up to a year it is usually granted, but if it goes beyond, we get the Opium Agent's sanction.

(Witness again described how men came to him for advances, and after enquiries had been made by his staff they made a report to him on which he again made enquiries.)

56. Q. (Mr. Muir-Mackenzie).—I don't see from all you have said how your advances are given within three or four days of the application?—That is, when a special man comes and says his well requires repairs, I go and inspect it and give him an advance. Those are special cases. What I have described is the usual procedure. When a man has got the time he follows the usual procedure. In special cases there is nothing to prevent him making his application at any time during the cold weather.

57. Q. Then you can manage to get all your enquiry done in three or four days?—Yes, in urgent cases.

58. Q. (Mr. Rajaratna Mudaliar).—You said that the cultivators come to you for advances every year?—Yes.

59. Q. Then these applications are probably chiefly for the expenses of cultivation and not for wells?—That is for cultivation entirely. That has nothing to do with wells. Wells are entirely a separate department.

60. Q. What proportion of advances go for cultivation and what proportion to wells?—Advances are all for cultivation. There are special men who want to sink wells. I have 70,000 cultivators. Out of these 200 or 300 or 400 may apply for well advances.

61. Q. The advances are repayable within two or three years?—Opium advances are paid from the produce next season.

62. Q. You spoke of middle-men bringing up a number of cultivators. Who are these middle-men?—They are themselves cultivators. They are a little better off than all the other cultivators. The cultivators themselves select these men to represent them and bring them up, and we depend on these middle-men for information as to whether a particular cultivator should be trusted or not.

63. Q. Don't you think that these cultivators will be at the mercy of the middle-men. For the favourable recommendation that these middle-men give to the others they might probably expect some remuneration from the others?—There are rates fixed for these men at eight annas a *bigha*. They cannot demand more.

64. Q. Does a middle-man undertake any responsibility?—He along with the others. He is to a certain extent responsible that these men are solvent and that they are genuine cultivators, but the responsibility is for everyone under the licence.

65. Q. (Mr. Muir-Mackenzie).—Is it essential that a man should have a middle-man's recommendation before he can get advances for wells?—Not always. Sometimes, if we know men are solvent and have property, we give them advances quite independently of middle-men. Very often zamindars apply for well advances. Some months back we gave an indigo planter, Mr. Severs, of Murpa Factory, Rs. 210 for 70 *kacheha* wells.

66. Q. You realise the advances for cultivation before the opium crop is removed?—We weigh the opium, deduct advances and pay them.

Mr. T. Butler.

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Witness No. 37.—Mr. T. Butler, Superintending Engineer, Muzaffarpur.
(Replies to printed questions.)

I.—The report refers to North Bihar comprising the districts of Champaran, Tirhoot, Darbhanga and Saran. I was employed on surveys for canals in North Champaran

for six months in 1897, and have been Inspector of Works in these districts since March 1898.

North Bihar, as regards irrigation questions, may be divided into two parts, viz.—

(a) The submontane tract comprising that portion of Champaran north of the Sekran or Boor Gandak river, and that portion of the Tirhoot and Darbhanga districts 15 to 20 miles south of the Nepal boundary.

(b) That portion of North Bihar south of the submontane section.

In (a) the soil is either sandy clay, or clay locally termed "bhangar" for a depth of 2 or 3 feet, below which is sand. This soil does not retain moisture, and hence requires plentiful rain or irrigation to produce good crops.

Rice is the crop chiefly cultivated in this tract.

In (b) the soil is chiefly a white loam, very retentive of moisture, and, when cultivated, the moisture rises to the surface. Indian-corn, indigo and *rabi* are the crops chiefly cultivated. Rice is grown only in the low lands or *chauras* on which more or less water remains in ordinary years throughout the rainy season.

II.—The average annual rainfall is—

(a) 60 inches,

(b) 48 "

but the value of the rainfall to the crops depends not so much on the total amount of rain that falls during the year as to whether it falls at a suitable time for the crops.

III.—In (a) the only existing canal is a small one, 6 miles in length, named the Madhuban; but the water from the numerous hill streams which cross this tract is utilized by the cultivators by means of small inundation channels locally called *pains*, and when the supply in the streams falls at the end of the rainy season, earthen dams are often constructed in them to supply water through the *pains*. Most of these streams spill over their banks in high flood, and submerge the country on both sides; but as the slope of the country is from 4 to 6 feet per mile, the flood-water usually passes off quickly and is beneficial to the *kharif* crops.

Early in October when the rain ceases or when there is any considerable break in the rains, the supply in most of these hill streams falls very low or dries up altogether, as most of them are banded in Nepal territory, the only exceptions being the Gandak, Bagmatti and Kumla which have a considerable supply throughout the year.

In this tract, when the supply of water is sufficient, magnificent rice crops are obtained, and the only obstacle to irrigation is the uncertainty of supply if the water is taken from the smaller streams, and the lack of funds to construct schemes from the larger rivers.

Two canals are now being constructed by Government, viz., the Tribeni Canal taking off from the Gandak river to irrigate 80,000 acres of rice in North-West Champaran, the length of the main canal to be 60 miles, and the Dhaka Canal taking off from the Lal Backeye river to irrigate 15,000 acres of rice in north-east of Champaran, the length of the main canals being 10 miles.

Preliminary investigations have also been made for several smaller canals.

In (b) the only canals are those in the north-west of Saran which were constructed about twenty years ago. They consist of 4 sluices in the flood embankment on the right of the Gandak river. These sluices are supplied from a *sota* of the Gandak river which runs parallel and close to the flood embankment. The sluices discharge into four natural nullahs which extend to the west and south of the district.

During the flood season an ample supply can be obtained through these sluices, but there are no means of distributing it from the nullahs. After the flood season, a supply can be obtained through these sluices by making earthen dams in the *sota*. These canals have proved a failure chiefly on account of the uncertainty of the supply and the want of means of distributing and controlling the supply in the nullahs.

Irrigation is required only in an unusually dry year or when the *hafia* rains fail, and in the latter case the level in the *sota* is often too low to send a supply through the sluices without constructing an earthen dam, and such a dam cannot be constructed till the discharge of the *sota* has reduced, and it is then too late to irrigate the rice crop.

VII.—There are as yet no canals of continuous flow in North Bihar. The Madhuban Canal cannot be classed under this head, as the discharge of the river Teur which supplies it falls very low when the rains cease.

XII.—The Madhuban Canal takes off from the Teur over just below the Nepal frontier. There is a masonry weir in the river and head sluice and bridges on the canal which is only 6 miles long.

There are no distributaries, only some small village channels constructed by the cultivators. If suitable distributing channels and regulators were constructed, the area that could be irrigated would be considerably extended. At present the water flows as best it can from field to field, and has to be lifted on to the higher lands, and there is a considerable waste. The Teur river is a hill stream from Nepal, and the floods rise and fall rapidly, and after the 15th October the discharge is small, and in a dry year is not more than 50 cubic feet per second; but in a year of ordinary rainfall the supply during the *kharif* season is sufficient to irrigate all the area commanded by the canal.

XIII.—Rice is grown on the greater part of the area commanded by the canal, and in years of scanty rainfall the produce from the fully-irrigated crop is double that from the unirrigated crop.

XV.—There are several tanks in the area from which in a dry year the cultivators lift the water for irrigation of the rice crop, but this source of supply is soon exhausted.

XVII.—No water-rates are levied for irrigation from this canal owing to some faulty agreement with the zamindar when the canal was constructed, and the cost of maintaining the canal is borne by Government. If suitable distributing channels and regulators were constructed by Government, it would probably be possible to realise sufficient water-rates to cover the cost of maintaining the canal.

The Saran Canals, which were constructed about twenty years ago, were for ten years worked under a guarantee from the planters of the district, who paid a lump sum yearly and were allowed to realise from the cultivators what water-rates they could under the rules. They found it, however, impossible to realise a moiety of these water-rates owing to want of control over the water, and hence did not renew the guarantee, and the canals remained closed for several years. In 1896-97, and again in 1900 and in current year the canals were, at the request of the Civil authorities, with the idea of mitigating the impending scarcity, opened at the end of the *kharif* season, no charge being made for the irrigation from them. The area irrigated was, however, small.

Full details regarding the Tribeni and Dhaka Canals, now under construction, are given in the reports which accompany these projects.

These, with the Madhuban Canal and two small canals proposed from the Telawge and Pusna rivers, would irrigate the whole of that portion of the Champaran district which requires irrigation, except a small strip north of the Tribeni Canal, which must depend for irrigation on the *pains* taking off from the hill streams. These *pains* would be much more useful if they were better aligned and provided with head sluices. The supply from these hill streams, though small in a year of drought, would probably be sufficient to irrigate the greater part of this area.

Note on the proposal made by Sir Thomas Higham, Secretary to Government of India, to increase the capacity of the syphons on Tribeni Canal.

Sir Thomas Higham proposed to increase the width of each vent of the syphons from 6 to 8 feet.

There are to be six such syphons on the canal, viz.—

	M.	ft.
Chota Bhubsa at 11	.	1,420 with 10 vents.
Bara Bhubsa at 13	.	1,500 " 10 "
Masan at 34	.	1,580 " 8 "
Hurhora at 46	.	3,720 " 7 "
Pandoye at 48	.	2,560 " 7 "
Mancari at 52	.	4,240 " 6 "

Head sluice.—The head sluice will have 22 vents each 6'4".

There will be *khurries* in front of the vents so as to take off water from the surface only.

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It was calculated that a depth of $2\frac{1}{2}$ feet over the *khurries* would give a discharge of 2,028 cusecs, and that with this discharge the velocity through the sluice vents would be 3.85 feet per second. By increasing the depth over the *khurries* to 3 feet, a discharge of about 2,500 cubic feet could be obtained. The difference of the level of the river and full supply in canal being in October about 2 feet.

Syphons.—The vents of the syphons were designed 6 feet wide and 6 feet high from floor to crown; the arch subtending an angle of 80° . The height of the Manuari syphon was to be $6\frac{1}{2}$ feet.

The area of such a vent 6 feet would be 3,411 square feet. It was assumed by the Chief Engineer, Mr. Buckley, that the head at the syphon would give a mean velocity through the vents of 7 feet per second.

The discharge through the syphons would therefore be—

Chota Bhubsa	10	$\times 3,444 \times 7 = 2,410$	cusecs	2,150
Bara Bhubsa	10	$\times 3,444 \times 7 = 2,410$	"	2,109
Masnu	8	$\times 3,444 \times 7 = 1,928$	"	1,570
Hurbora	7	$\times 3,444 \times 7 = 1,687$	"	1,207
Pandoyo	7	$\times 3,444 \times 7 = 1,687$	"	920
Manuari	6	$\times 3,744 \times 7 = 1,572$	"	780

The discharge required below each syphon to irrigate the commanded area of rice on the canal and its proposed extension taken at 200 acres per square mile is printed in italic figures. When the original design was prepared the velocity through the last 3 syphons was calculated at only 6 feet per second, and this would reduce the discharge through the Hurbora and Pandoyo to 1,416 cusecs and through the Manuari to 1,318 cusecs.

The discharge through the syphons after allowing for the irrigation of 200 acres per square mile with a duty of 50 acres per cusec on the Tribeni and its proposed extension would therefore give a surplus of—

Chota Bhubsa	. . . . .	260 cusecs.
Bara Bhubsa	. . . . .	301 "
Masnu	. . . . .	353 "
Hurbora	. . . . .	230 "
Pandoyo	. . . . .	526 "
Manuari	. . . . .	568 "

This surplus discharge would be sufficient for irrigating the area to the east of the present proposed terminus of the extension, *viz.*, the Fellay river provided that the two assumptions, *viz.*, that the area of rice requiring irrigation will not exceed 200 acres per square mile, and that there will be a velocity of 7 feet per second through the first 3 syphons and 6 feet through the latter 3 prove correct. There are 16 aqueducts over other streams besides the above syphons; the width of the aqueducts and their discharges are given in the annexed table:—

Serial No.	Width.	Discharge.	Velocity.	When enlarged velocity in canal.	Increased discharge with same velocity if depth was increased 6 inches.
1	70	2,160	4.41	3.22	164
2	70	2,155	4.39	2.91	123
3	70	2,050	4.18	2.55	116
4	70	2,025	4.11	2.55	144
5	65	2,000	4.40	2.55	143
6	65	1,970	4.33	2.55	141
7	65	1,900	4.18	2.10	136
8	60	1,800	4.28	2.10	128

Serial No.	Width.	Discharge.	Velocity.	When enlarged velocity in canal.	Increased discharge with same velocity if depth was increased 6 inches.
9	60	1,700	4.05	2.10	122
10	55	1,600	4.16	2.10	114
11	55	1,500	4.2	2.00	116
12	50	1,300	4.0	2.00	100
13	50	1,200	3.7	2.00	98
14	30	700	3.9	1.83	59
15	30	600	3.7	1.83	56

The italic figures show where the syphons come in.

From the above it will be seen that there must be a small afflux at each aqueduct to increase the velocity from that in the channel to that required to carry the discharge through the aqueduct, as the difference of coefficient between a masonry rectangular and a trapezoidal earthen channel will not give the necessary increase in velocity. To increase the discharge through the aqueducts by another 150 cubic feet without increasing the velocity, it would be necessary to widen those below No. 6, from 1 to 5 ft. The bridge up to aqueduct No. 8 are designed with 10 spans of 8 ft., so that the sectional area of the waterway would be $10 \times 8 \times 7 = 560$ sq. ft. and the velocity required to give the full discharge would be from 4 to 3 ft per second, and this will require a small afflux. If the depth of water was increased by 6 inches, the discharging capacity of the bridge would, without increasing the velocity, be increased from 160 to 150 per second. The waterway of the channel itself is designed when increased to carry supply from the proposed extension to be as follows:—

Reach.	Bed.	Width slope over 1,000.	Depth.	Velocity.	Discharge.	Discharge with depth increased 6".
1st	90	0.25	7	3.22	2,181	2,451
2nd	100	0.20	7	2.91	2,180	2,446
3rd	110	0.15	7	2.55	2,039	2,346
4th	110	0.10	7	2.10	1,725	1,940
5th	110	0.10	6.5	2.00	1,322	1,725
6th	100	0.10	6	1.50	1,297	1,353
7th	80	0.10	6	1.87	964	1,106
8th	65	0.10	6	1.83	782	898
Extension	401	0.2	5	2.19	493	

By increasing the depth by 6 inches and making the last two reaches which have not yet been excavated a little wider the canal would discharge an extra 200 cusecs. The banks are now constructed to 3 feet above full supply, but a margin of $2\frac{1}{2}$ feet would not be dangerous. To increase the discharging capacity of the canal by another 150 to 200 cusecs, it would be necessary to widen the aqueducts from No. 7 to the end and raise the water level 6 inches and to increase slightly the width of the channel on the last two reaches and to add another vent to the bridges below aqueduct No. 10.

1. Q. (The President.)—You have heard what the various witnesses—Mr. Growse, Mr. Hodding and others—have said about the Sarun Canal. Do you generally agree with them?—No. Their premises were all wrong. The supply of water available is very uncertain; the canals are only so-called canals; they are more inundation canals than anything else. They consist of sluices in the flood embankment of the Gandak river with short channels leading from a *sota* of the river to the sluices, and short channels from the sluices to old spill channels of the Gandak. Whenever there is a supply in the *sota* during the flood season you can get water through the sluices.

2. Q. Is there not always a supply in the flood season?—Not always. Generally between the 15th of June and the 15th of September you can get in what supply is wanted. After the 15th of September the flood is most uncertain. If you have a late flood, then you can get a supply; if you have not, then although there may be an ample supply, the level is too low to get it through the sluices.

3. Q. Have the sluices got their sills too high?—You could not make the sills any lower. You cannot keep the channels even to the level of the sills. They silt up. The first two or three miles of the canal silt up almost at once. There is almost no slope for the first two miles inside the sluices.

4. Q. What slope is that?—I do not think there is a slope of an inch a mile for the first two miles. The bed is practically horizontal.

5. Q. What is about the slope across the Sarun District?—It is about a foot to a foot and a half a mile.

6. Q. Then the uncertainty about the supply is at the time they want the water the most in the *kathia* time?—They want it then for irrigating the rice crops in the *chaur*s, and as described by the other witnesses a plentiful supply of water and not a mere sprinkling is essential for the *rabi* crops in a dry year.

7. Q. Could you not put in strong spurs that would force in the supply?—These would change the direction of the *sota*. The land on both sides is alluvial land (explains on the map).

8. Q. At present the water goes where it will. Supposing now that the villagers agree to pay a two pice cess, that will produce Rs. 50,000. Then what are the engineering points?—With that amount you could not do anything to give them a certain supply, and as it is they have an uncertain supply now without going to any expenditure. Even that uncertain supply would tide them over their difficulties generally. I think any money spent except in improving the distribution of the water would be money thrown away practically. It will cost a great deal of money to do what you suggest. The rivers which form the canals are flooded by drainage water in the rainy season. To pass off this drainage and at the same time have means of raising the water level, it would be necessary to construct masonry regulators. Earthen cross bunds with small bye-washes would obstruct the drainage of the country. On the other hand, a moderate expenditure on the distribution inside would meet the case except, say, in one bad year in 25. I think there is a general impression that the Public Works Department acted in a dog in the manger fashion in regard to these canals. They would not open them, because originally the people of the district agreed to pay for their maintenance, and when they refused to pay the canals were not opened till last year when the civil authorities said they should be opened to save them from famine. Whenever that cry was raised they were opened free of charge, but as there was no means of distributing water, this has done very little good.

9. Q. What is the most reasonable thing to do for the future?—We have not got enough benefit from the existing scheme. The existing scheme would give more benefit, if it were settled that we should not charge any rate but to distribute the water as best we can with the help of some money spent on the regulators and channels inside.

10. Q. You say that water can be given except in one year out of 25?—I don't think in a dry *kathia* we could give them water for the area that they mention. I think we could only do between 20,000 and 40,000 acres, and that only if they took the water before the *kathia*.

11. Q. These witnesses talked to-day about an expenditure of three lakhs?—I do not know where they got their figures from. They have got no irrigation officer that they could have consulted. I don't think they asked the Chief Engineer or anybody.

12. Q. (Sir Thomas Higham.)—Do the channels silt up?—For the first two feet above the sills of the sluices they silt up very rapidly. Above that silting

does not take place if you do not open the sluice during the high floods. They do not, as a rule, want it open during the high floods.

13. Q. Do you have to spend much money on clearing the silt?—None has been spent during the last four or five years. They spent Rs. 40,000 in one year when the canal was guaranteed, but that was too much.

14. Q. What do you suppose would be a fair maintenance charge, supposing it were to be under an engineer and done reasonably?—Rs. 10,000 a year. Rs. 40,000 was what they spent when the planters gave a guarantee.

15. Q. What was the amount of the guarantee?—4½ per cent. on the capital cost. I forget the exact amount. It was long before my time. Later on Rs. 21,000 was the amount of guarantee.

16. Q. That Rs. 40,000 was spent by the Department?—Yes. They used to spend a lot of money in trying to make cross bunds in the *sota*.

17. Q. (The President.)—I don't think that anything that you have said is really against what these gentlemen advanced this morning. You are merely showing what they perhaps did not realise—the uncertainties of the supply?—I agree with nearly everything that was said, except their premises. Mr. Fjllgate's proposal meets the facts of the case. If you had cuts from these rivers into the *chaur*s and filled them up, it is really all that they want to save the country from scarcity, and in addition to this, if they had smaller cuts from all the sluices in the embankment, they would irrigate a very large area of rice. There are 30 to 35 sluices down the embankment, and those sluices now are opened at the request of the cultivators, provided nobody raises an objection. If anybody raises an objection, the Collector has to decide it. By the time the decision is arrived at it is generally too late. Where there is no channel to lead the water from the sluices they are a source of frequent complaint. If water is passed through them, it flows over the adjacent lands causing damage to some lands and benefit to others.

18. Q. How long would these channels require to be?—A very short length some of them; none of them would be over a mile. They only want to go into the nearest *chaur* and then the water finds its way from *chaur* to *chaur* all over the country. If you wanted to spend money for famine protection, I think you would get more protection in spending it in that way than almost any other.

19. Q. Could you now tell us about the Tribeni Canal? Could you show us a plan of it?—Witness presented a map on which he explained the scheme to the Commission.

20. Q. What will be the cost?—Thirty-seven lakhs for 60 miles. You cannot extend it beyond the Tilawi on account of the only possible alignment having to pass through Nepal.

21. Q. Could not some settlement be arrived at with the Nepalese?—I expect the Nepalese would claim irrigation for all this here (indicates on map). We would not gain much by it.

22. Q. What do you fix the minimum discharge of the Tribeni at?—Sufficient to irrigate 200 acres to the square mile with a duty of 50 acres to the cubic foot.

23. Q. How is the work getting on?—We only started it last year. It is in an out-of-the-way part of the world and has a bad reputation for fever, and we had great difficulty in getting contractors to go up there. We have made a good start now and I hope we shall get the first fifteen miles open this year.

24. Q. I cannot see why if all that Nepal would ask would be irrigation for the parts you refer to, we could not give it to them?—I do not know what could be done, but from what one hears about Nepal they would not allow a European in their country.

25. Q. Now please tell us about the other projects?—I would first like to explain what the witnesses said about the pains? The Tribeni Canal crosses 22 streams, of which six are real hill streams which have sandy beds, not more than three or four feet below the level of the country. The others are deep nullahs. From all these hill streams they have any number of *pains*. Now they take nearly every drop of water out of these streams. The nullahs are much deeper and have fewer *pains* taking off from them. I think a good deal could be done especially from the two principal streams in regulating these *pains*. At present there is no order. A man takes as much water as he wants and turns the rest on to his neighbours' lands.

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26. Q. Do you propose to feed these pains from the canal?—No. The distribution of water from them should be regulated to irrigate the area between the foot of the hills and the canal. That is a very arid tract. The land is good and it only wants water to get a good crop. They do get good crops wherever they can get the water. It wants some legislation to settle rights and distribute water to the best advantage. If we take the projects in order, the Tilawi comes first. Mr. Dunsford said the Tilawi is never banded in Nepal. I don't think he is quite correct there. What he means is that such banding has never affected his supply. There is always, I believe, a certain supply coming down. I think the scheme sketched out in the report would not be a very expensive one. It would be advisable to at first construct only a sluice on the river bank with a channel leading from it to the area to be irrigated. When the water level on the river fell too low to feed the sluice, an earthen cross bund could be constructed to raise the water level. Afterwards if considered advisable the earthen bund could be replaced by a masonry weir. No doubt we would interfere with Mr. Dunsford's little scheme and probably he would want for a certain area for nothing.

27. Q. As regards the Tilawi, supposing the water failed you, you could supply it from the Tribeni extension?—Yes. Any surplus we had could be passed into it. I think we could always depend for a supply from the Tribeni when this extension was made.

28. Q. What would be the supply?—A certain supply of 30 or 40 cubic feet per second.

29. Q. (Sir Thomas Higham.)—You cannot work on the Tilawi without a weir?—The idea was to have a weir across the Tilawi and use the water of the Tilawi and any surplus water from the Tribeni extension.

30. Q. Then we come on to the Poussa?—That is a very small scheme, but though the Nepalese do band the river, they cannot band it till the water runs low, and even when they band it, there is a certain amount of water from percolation.

31. Q. What does the river do in a dry year?—It dries up altogether after the middle of October.

32. Q. What amount do they get for the *hathia*?—You get sufficient to irrigate five or six thousand acres for the *hathia*.

33. Q. Next comes the Bakiya?—The Bakiya is practically the same as the Poussa. The Madhubani Canal cuts in between the Poussa and the Bakiya. There has just been a new distributary sanctioned from it and we expect to be able to charge a water-rate from that. In the Bakiya we made a cross bund; they probably would make a little canal themselves if we laid it out for them, but they would probably prefer somebody with authority like the Collector to administer it.

34. Q. Have these schemes all gone in to the Government of India?—They have been only sketched out

for this Commission. They have not been actually levelled except the Tribeni and Dhakka.

35. Q. Next comes the Dhakka?—Three-fourths of that has been completed. We expect to get water from it next year.

36. Q. How many cubic feet per second?—It is estimated at 300, but we cut it down to 170.

37. Q. Do you want a weir across the river?—Yes. Across the Lal Bakiya.

38. Q. Then we come on to a bigger scheme, the Bagmati?—I am afraid that is a very hopeless case. It was commenced as a famine work. Under instructions I prepared a report for a scheme without a weir.

39. Q. What is wrong with the scheme; no water in the river?—There is water in the Bagmati, but the difficulty would be to get it into the canal without a weir. You are never sure that the deep stream will remain on your side of the river, because the river wanders from side to side. What Mr. Disney proposed was to make a canal only for *rabi* irrigation so as to avoid any expense of masonry works; that is, to make a series of long channels, so that the flood water of the river would be allowed to go between them, and he proposes in the cold weather to band those gaps and put a cross bund on the river below and thus let the water come down into the *Lakandi*. If you can do that it might pay, but I am afraid there would hardly be time enough to get the water for the sowing of the *rabi* crop. It would entail considerable expense and the people would not care to do it unless they really wanted that water. Then again, when you get it into the *Lakandi*, you have no means of distributing it. There is one other point I would like to mention; it is in regard to making channels from the sluices in embankments. I think that is one of the cheapest and most economical ways of saving portion of the rice crop in a dry season. Mr. Disney has, I think, made a note on it. It appeals to the men here; they understand it more than anything else.

40. Q. (Sir Thomas Higham.)—Have you sandbag bunds at all here?—Not usually.

41. Q. (The President.)—What about the Dous scheme?—That is in Durbhanga. I know nothing about it personally. I have never seen the country that could be irrigated from the Dousa.

42. Q. (The President.)—Then what do you say as regards the Kamala?—On the Kamala I have seen part of the country. It is essentially a rice country. The levels are known; a canal is feasible and the supply is sure, and it would be a really sound scheme. I think the only question about the Kamla scheme is whether the people are willing to pay a water-rate.

43. Q. Is that a country with European planters?—There are few so far north. The land nearly all belongs to the Durbhanga Raj.

FIFTH DAY.

Durbhanga, 30th October 1902.

WITNESS No. 33.—MR. A. H. O. MACCARTHY, Executive Engineer, Gandak Division.

Mr. A. H. C. 1. Q. (The President.)—How many years have you been here?—Eight months.

MacCarthy. 2. Q. Have you any previous knowledge of the district?—No.

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3. Q. Do you know the Saran canals?—Yes; the regulation of the head sluices is under my charge.

4. Q. Do you know the wishes of the people in regard to those canals?—Yes.

5. Q. What is your opinion about them?—Personally I do not think that any satisfactory project is possible except to make a high level canal and have the control of the water in the hands of the Public Works Department. The channels must be properly graded with weirs across them. Then it might work.

6. Q. But you cannot say definitely?—No. There is no impossibility in the scheme. It is all a question of cost. The canals would get a good supply up to the middle of October, and then they would suddenly fail.

7. Q. Are the sluices high and dry for a considerable part of the year?—I cannot say.

8. Q. Would it be any good to lower the sills?—I do not know. I have been told it would be useless. I think there is some water in the *sofa* all the year round, but I have not seen it myself in the cold weather.

9. Q. As to the Durbhanga schemes: what is your opinion as to the Dhous scheme?—There is no assured supply of water, because it is banded in Nepal. Last year there were two bunds in Nepal. This year from September 20th to October 20th the discharge was 2,000–350 cusecs, but this year is an exceptional year; no one wants water. There are no gauges now; they have been all swept away. I was told to take discharge observations only.

10. Q. That seems a fatal objection to this Dhous scheme?—I heard in the May before last that it has never been banded except in the cold weather and that there was always a good supply of water. Last year it was banded and there was no discharge at all.

11. Q. Have you had occasion to look into this scheme at all apart from the water-supply?—Yes, I was the one who drew up the scheme for it. The area commanded by the Dhous is 70 square miles.

12. Q. Is the Kamla a much more promising scheme, I believe?—There is a scheme drawn up, with plans and estimates prepared. The original scheme was to cost more than 20½ lakhs.

13. Q. And the river has warped for six miles?—Yes, the Balan has shifted over the country. But the second half of the scheme, the western portion, I calculate to cost Rs. 10,41,000. There was not sufficient water to carry out the further scheme.

14. Q. It was not to obtain water from the Balan?—No; it was merely to be extended to the Balan.

15. Q. Have you got the discharges of the Kamla?—On the 6th of October it was 4,087 cusecs, on the 13th it was 3,303 and on the 20th 2,015. It was an exceptional year.

16. Q. Is the scheme, as it now stands, a modified one?—I cut out the eastern portion. In other respects the scheme is exactly as it was.

17. Q. If the order were given, can you commence the execution of the work at once?—No; it requires a good deal of revision; I only did it roughly. It is not in working order yet.

18. Q. Is the river pretty constant at the site proposed?—Judging from the old maps that we have got of 20 or 30 years ago it has not changed a bit on the frontier. But it has changed a great deal further down. The bed at Jynugar is very constant.

19. Q. Has there been any record of the discharge?—No.

20. Q. Is the river dry towards the end of the cold weather?—It is constant in the cold weather. In May

there was two feet of water in the river, but I could see no flow. *Mr. A.H.C. MacCarthy.*

21. Q. (Sir Thomas Higham).—Are there any gauges kept on the Saran canals?—Yes; at head sluices. 30 Oct. 02.

22. Q. How many years back do they run?—For 20 years, I suppose; since the canal was started. But they have not been read when the canal has been closed. There is a hiatus.

23. Q. Do you know the discharge?—The maximum discharge was 150 cusecs from the head gate. My experience is that if you give water to one sluice you cannot always give it to the other, that is, in the hot weather, before the rains. The bunds were put in November last year; they went when the rains burst. During the last year we did not require any water; it was only later in the year when the river had gone down. We cut the entrance bund to let water down and it was that time we got 150 cusecs.

24. Q. Are these canals open just now?—Yes; but the river has fallen so low now that there is practically no water in the *sota*, and unless we put cross bunds there will be no supply. One bund costs Rs. 700; the others only Rs. 150. The Gandaki will be difficult, because you will have to put a by-wash in it.

25. Q. What is the total supply in the *sota*?—Not more than 250 cusecs, I think.

26. Q. Is there any fear that the *sota* will change its course?—There is very great fear.

27. Q. You have a good many sluices in the embankment which have never been opened?—A good many.

28. Q. What were they made for?—I presume for irrigation. They are never used now. I suppose they were built before the canal was built. They are all the way down to Sonapore.

WITNESS No. 33.—MR. S. L. MADDOX, Collector of Durbhanga.

1. Q. (The President).—How long have you been in this place?—A year this time, and ten years ago I acted for three months. I was some time Sub-divisional Officer to the south of this district.

2. Q. (Mr. Muir-Mackenzie).—Were you here in the famine?—No.

3. Q. (The President).—We are much obliged to you for the carefully prepared paper you have submitted. You say in "Benipatti Thana the comparatively large area under irrigation is on account of the connections between the Kamla channels made by Mr. R. S. King, Raj Sub-Manager. Some of these channels are also situated in Madhubani Thana." I notice in the statement in the front page that in the Benipatti Division there are 42,655 acres entered as the average irrigated area. Is this area due to the action of the Kamla channels made by Mr. King?—Not entirely. There are small tanks and other small nullahs from which irrigation is made. This is the total from the settlement record for that thana.

4. Q. In reply to question 4 you say "the cultivation is not dependent on artificial irrigation here": in ordinary years, I presume?—The ordinary rainfall is sufficient.

5. Q. You give a list of the seasons of famine and severe scarcity. It is a little difficult to draw the line between famine and severe scarcity. Have you any particular rule in your mind?—I call 1892 severe scarcity not amounting to famine. Last year was scarcity, but not severe scarcity. 1893-96 would be severe scarcity, not amounting to famine. I was guided by the figures for relief more than anything else and also by the Government of Bengal's letter. I have taken the terms used therein.

6. Q. The number relieved is not a very good criterion, because the policy of the Government is not the same every year?—That is so, especially in 1873-74.

7. Q. In 1896-97 the rice crop was only 31 per cent.?—Yes.

8. Q. In 1901-02 "the failure, having followed three years of good crops, did not cause famine." That is, prices did not go up very high?—And there was a very good rice crop in Nepal.

9. Q. In 1873 you say "Mr. Carlyle (on incorrect areas) calculates the yield of the crops," etc.?—He had not the settlement records; that is all I meant.

10. Q. I see he puts down a normal yield as 28½ lakhs of maunds, and you work it out as 293 lakhs.

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The difference is not much?—No, but he had not the area as correct as we have, because the survey came in between.

11. Q. Do cultivators in this district attach the same importance to a supply of water during the *hathia*, the early part of October, as we have found to be the case elsewhere?—They do.

12. Q. I suppose these figures are correct at the bottom of page 6; that there have been 76 lakhs of rupees spent in 29 years?—My authority is the Government of Bengal's letter.

13. Q. Supposing satisfactory irrigation schemes were carried out in Northern Durbhanga, in how many years out of ten would the people take water?—At first they would not take water until they were driven to it; at first once in every five years, and after they have appreciated the benefits of it they would take water oftener.

14. Q. If the Nepalese allow water to come down only when nobody wants it, it is not worth while spending money on the Dhous scheme?—No.

15. Q. On page 6 you say "it is stated in Mr. Maconochy's note that originally the 'Kamla scheme, provided for an extension of the channel eastward to the Balan, but that now that the Balan has shifted its main channel' 7 miles eastward, the larger scheme could not be undertaken." Mr. Maconochy gives us another reason that there is no water?—Yes, but I am not satisfied that Mr. Maconochy was correctly informed that the Balan has actually shifted.

16. Q. You say in the next paragraph that there is "a scheme for connecting the channels of the Bihul and Panchi and running distributaries southward over the northern portions of Allapore." You hope to produce the plans?—Yes. Kharag, not Panchi, is the correct name of the second river.

17. Q. It is a project that the engineers have not taken up at all?—No; it was done when the Durbhanga Raj was in the Court of Wards, and I do not think it has been scrutinised by the Government engineers.

18. Q. Have you reason to believe that it deserves scrutiny?—I have. I have rough plans here. [Explanation of plans.]

19. Q. The essential points seem to be: how much water we can count upon in a year of scarcity. Nepal keeps the water-cock in her hands. Is that part of a district where there is severe want?—Yes; but not quite so severe as in the north-west parts. There is another channel too, since then, to cost Rs. 2,000

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Mr. S. I. just north of the end of the Kamla channel, if carried eastward to the Bolan, 25 miles.

Maddox. 20. Q. Is that the kind of thing the Maharaja would undertake?—I think so, to give famine relief.

30 Oct. 02. 21. Q. You say that well irrigation is not practised in this district?—That is so. In the south-west, bordering on Hajipur, they use wells for garden produce and in the north-west for opium and special crops they use a few wells, but the soil is not fit for wells in this district.

22. Q. Another reason might be that the whole of the country is under rice?—Yes; *kacheha* wells could not stand the floods. A *pakka* well would not be sufficient for the irrigation of rice.

23. Q. In order to prepare the district for the possible advent of another famine, you strongly advocate the carrying out of these irrigation schemes in the north, assuming that they are technically possible?—Yes.

24. Q. And do you think that they would meet the situation? If the Collector had not got on his shoulders a very hungry population in the northern part of the district, you would pull through famine all right?—Yes, if a large section of the area were protected, we should pull through without relief works.

25. Q. Do you keep a programme for relief works?—Yes.

26. Q. Is that arranged under your direction by the District Engineer?—Yes; when I came in November I found a programme and modified it to suit the places where the crops had failed. It is principally of roads and tanks.

27. Q. Tanks merely for drinking water for cattle, etc.?—Yes.

28. Q. Excavated?—Yes.

29. Q. Is there much room for the making of roads?—There is room for the improving of roads, but we do not want any more new roads.

30. Q. It is difficult to find work for famine relief. Then, supposing this Kamla scheme passes scrutiny from the engineering point of view, would you keep it in reserve for future famines for relief, or would you carry it out at once for protection?—At once, to see how far it serves.

31. Q. (Mr. Muir-Mackenzie.)—There is a considerable area under *bhadoi* rice?—*Aus* paddy we call it.

32. Q. Could the other kind of rice, *aghani*, be substituted if irrigation were introduced? It grows at a different time, it is an early paddy?—I cannot say.

33. Q. These tanks and roads apparently are not likely to be of much use to you; could you substitute in your programme any works likely to be useful for irrigation?—Yes, I have got in my amended programme some local works, channels and things which I have found out—things locally useful, for a small number of people. I have four or five for each thana.

34. Q. Would it not be possible to devise a programme of such works as would employ a large number of people, supposing you had a special officer going about the country investigating this matter?—Certainly.

35. Q. What would be the nature of the work?—*Pains* entirely. A great many might be made.

36. Q. And nothing in the nature of irrigation tanks, or *ahars*?—I have no experience of them, but I fancy the floods would make reservoir-making difficult.

37. Q. When the famine was over you try to encourage the digging of *kacheha* wells anywhere?—I was not here during the famine. In my answer on page 2 to question 11 I say "the Commissioner in his No. 609-G. of 1896" (which must have been at the time of famine) "agrees with the Collector that rewards for making *kacheha* wells in this district are not advisable owing to the nature of the soil."

38. Q. But do you think that is the case?—It would be in the north of the district. They would be useful in the south, but the two southern thanas are not in our famine area.

39. Q. Would you expect the floods to spoil your wells if you made them at the commencement of the famine? But would you get the water then?—No, I think not.

40. Q. With regard to the extension of well irrigation, there appears to be some part of the district where the Opium Department find it worth while to make wells. Do you not think a little more might be done by the Revenue Department on the same lines?—Yes, except in rice lands.

41. Q. In these parts is there any substantial proportion of land which is not rice land?—In the *Kajauli* Thana where there is a substantial area of *rabi* lands.

42. Q. What is the immunity of the two southern thanas due to?—To the difference of the soil and the variety of the crops. They are not dependent on rice.

43. Q. Not due to their irrigation?—No.

44. Q. Were advances given in the famine to encourage the construction of *pains* anywhere?—I believe not.

45. Q. Do you anticipate that such advances might usefully be made?—If one could know a little beforehand, but if there was no water, they would not be so ready to come forward to take advances for *pains*.

46. Q. Therefore in famine time advances would be of no use. If advances were made in good years, would the people make *pains*?—In certain areas, yes. It would depend on the influence of the zamindars?—That assumes that the advances would be given generally to the tenants. Do not you think the zamindars should be induced to make the *pains*?—The Maharaja is a large zamindar and he would make *pains*.

47. Q. In answer to question 8, clause I, you give the percentage of outturn. I believe 100 is supposed to be a rich crop?—A normal crop.

48. Q. Then in 10 years you have only got two crops of *bhadoi*, two of *aghani* and one of *rabi*. Does not that indicate a tendency on the part of the people to under-estimate their crops? They never will acknowledge the normal crop?—Yes.

49. Q. Perhaps 75 or 80 might be a normal crop?—Yes.

50. Q. May we take it as probable that in this district you will not have anything like a famine unless you have two bad years running?—The figures show that, because last year we had a less total, 57 inches as against 58 in the famine year, and there was no famine last year.

51. Q. Does the district feed itself in normal times?—I should say so.

52. Q. Do you ever think of having any smaller irrigation works in the district that might be managed by the District Board?—I should like to have such works.

53. Q. Would you like to see the District Board empowered contrary to the present law?—Yes.

54. Q. Would you prefer that the Board should manage it or the Collector?—The Collector is Chairman of the District Board.

55. Q. Should he have the Board to act with or by himself?—There are some officers who entertain a very strong opinion that the Collector could do more if he were made independent of the Board. In Saran, however, the Board is particularly strong. There, some think, that the Board might help very much.

56. Q. A hundred thousand acres are already irrigated by *pains* or other sources—private irrigation works other than wells?—Perhaps Mr. King's channels might help very much.

57. Q. Have you a strong Board here?—Yes; many of these gentlemen present are members of our Board—Mr. Lloyd, Mr. King and others.

58. Q. What class of work would you put under the Board?—I had intended to put the following works under the Board. [Quotation from supplementary statement.] In the course of my enquiries in camp I proposed the following local works of utility; but as good rain fell in March just when the conditions in the north-east frontier (Phulparas) were becoming critical, so no estimates were prepared:—

"1. Durbhanga Thana. (1) Channel from the river Sikāru to the river Bārnad; thence into the northern villages of Jallay outpost.

(2) Chandehar tank in Paktola to be excavated and channel to be dug out on the south-east.

(3) In Joginra Babaji's tank to be dug out and road raised for four miles from the Chamartola to the Madhubani road; also a tank in the south of Joginra.

(4) In Ratanpur three tanks to be dug out.

"2. Bahera Thana. (1) A channel to be cut from the Kamla river to Madhopur (north-west of Bahera).

(2) A tank to be excavated on the west side of Pohardi village.

3. Phulpurna Thana. (1) A channel four miles long from the Balan river at Parsahi to Kalpatti through Maharajpur, Siswar, Dhanjora and Kallapatti. Levels have been taken and estimates for Rs. 10,000 have been drawn out. The Maharaja will probably undertake this work.

(3) Further north near the frontier, a channel to connect the Bihul and Pancha hill streams.

4. Khajauli Thana. (1) A channel to be cut from the Kamla river at Marhia Ghat and to be brought southward through the affected villages.

5. Benipati Thana. (1) Mr. Christian's channel bringing water southward.

(3) A channel to be deepened and dug out from the Jamoi river to Kowaha.

59. Q. If you utilise the period of good years to have a thorough investigation of the country, you would get well considered schemes in a considerable number of places?—Yes.

60. Q. You have considerable experience as a Settlement Officer?—Yes. I was in Orissa seven years on settlement work.

61. Q. You have never framed anything like records in water?—No.

62. Q. Do you think it might be useful in places where there is a considerable amount of complication in the rights to the water; for instance, on rivers where disputes arise as to the right to erect bunds and pains, where disputes are likely to arise as to time in which the water is to be used? Would not it be valuable to enter these things?—Yes, most valuable.

63. Q. And would you advocate the Collector having power to decide disputes when they arose in the light of the facts recorded in the record-of-rights? At present they have to go to the Civil Courts?—Yes, and with a large extent of bitterness.

64. Q. (Mr. Rajaratna Mudaliar.)—Are there many pains in this zamindari?—Not many.

65. Q. A hundred thousand acres are already irrigated by pains or other sources—private irrigation works other than wells?—Perhaps Mr. King's channels might account for 80 per cent. of that.

66. Q. Is there scope for the construction of more pains?—Yes.

67. Q. Is the Durbhanga State prepared to carry them out?—I think the Maharaja would do so if he were assured that pains were for the benefit of the estate.

68. Q. I suppose they have not been investigated?—Mr. King is doing a good deal in the north of the district, and I believe he has plans for the eastern Kamla sluices.

69. Q. (Mr. Muir-Mackenzie.)—Have you had much experience in takavi advances?—No.

70. Q. During this last year have you granted many?—A few; about Rs. 1,600.

71. Q. That is a very small sum for a large district?—Yes.

72. Q. What are the reasons; why you are unable to get rid of any more?—The rains apply so very late. If they would apply earlier, we could give them advances. They apply when the season has gone.

73. Q. There were a good many applications that were not complied with?—No; generally the applications are complied with when they are put in. They go on in their distress until advances for seeds, etc., are useless and then apply; that is, very few apply.

74. Q. How long would it take you to go through the enquiry before you grant the application?—A long time.

75. Q. Do not you think that that time ought to be shortened?—Yes.

76. Q. What method would you propose?—Let one Deputy Collector devote his time to the purpose.

77. Q. Would you put a man on that and nothing else?—We could not spare him.

78. Q. If you were given additional men?—Yes.

79. Q. Would there be enough work for him to do? Not always; only perhaps at certain times.

80. Q. Would that only arise in a big famine?—No; in severe scarcity and scarcity.

81. Q. In scarcity would you like to apply to your Local Government to give you a special man?—Yes.

82. Q. Would you send him out with money in his pocket?—I should like to do that.

83. Q. With machinery of that sort how long do you think it would take to dispose of the applications?—We could dispose of them within a week. I see no reason why we could not do this. It would depend on the number put in a week.

84. Q. How many Sub-divisional Officers have you?—I have two—one at Samastipur and one at Madhubani.

85. Q. Are they empowered to grant takavi loans?—They are empowered to make enquiries. They don't actually grant the loans; they recommend to me.

86. Q. Are they empowered to receive applications?—I think so. I am not certain. Mr. Watson is here and he would be able to tell you.

87. Q. Do you think it would be a good thing, if, as a matter of course, all Sub-divisional Officers were empowered?—Certainly.

88. Q. Do you apply every year for a certain allotment for advances?—Yes. In fact last January I applied for an extra allotment, but I could not spend it before March. I have plenty for this year.

89. Q. How much?—I cannot tell you. I will find out and let you know to-morrow.

90. Q. It is nothing like a lakh of rupees?—No.

91. Q. Rs. 10,000?—I think we have Rs. 5,000 for this year.

92. Q. (Mr. Allen.)—We only got four lakhs for the whole province.

93. Q. (Mr. Rajaratna Mudaliar.)—I suppose zamindars would be disposed to grant loans?—Yes. Zamindars do grant loans; the Maharaja grants loans.

94. Q. What rate of interest is charged?—I don't know; I have no idea at all.

95. Q. (Mr. Muir-Mackenzie.)—Are the loans under the Lands Improvements Act or the Agricultural Loans Act?—Our applications generally are under the Agricultural Loans Act and not under the Lands Improvements Act.

96. Q. (Mr. Rajaratna Mudaliar.)—The Agricultural loans is chiefly for opium?—That is different. They give such advances independently of the Collector.

97. Q. (Mr. Allen.)—What were the floods due to this year,—all the streams?—The first flood which broke in the frontier on the 12th came down in the Jamini, Kamla and the Balan, and it was due, it is said, to 20 inches of rain in Nepal—not to any local rainfall.

98. Q. After that was the flooding of the streams general, or confined to any particular streams?—General in the first flood.

99. Q. Durbhanga is the biggest rice-growing district in Bihar?—I have not seen the figures.

100. Q. There is a very large quantity of rice imported from Durbhanga?—Yes.

101. Q. Especially from Saran?—That I don't know.

102. Q. In connection with this question about District Boards taking up irrigation, if the law were amended, would the District Board have any funds to meet the deficit from irrigation schemes? Would you have enough money for roads and have a surplus in the District Fund?—This year we have, because we put away Rs. 71,000 to be spent on famine and there was no famine.

103. Q. In ordinary years would you, as a rule, have a surplus?—We have. My opinion is that the District Engineers do not spend all the money allotted to them every year, and that in fact there are savings every year. I think I could prove that from the figures.

104. Q.—It is the general experience that District Boards have not sufficient funds to carry on their own ordinary work?—This (Durbhanga) is a very much richer District Board than most.

105. Q. (The President.)—Where do the District Board get their funds?—From road cess.

106. Q. (Mr. Allen.)—Has any scheme been put forward in this district by the District Engineer for feeding tanks by pains from rivers?—Yes.

107. Q. Can you give us some opinion about that?—Here is a report which Mr. Barton sent to me, and Mr. Barton is on leave. I only found it yesterday.

108. Q. It was a scheme, I understand, for feeding tanks by pains?—For feeding tanks some existing and others had to be made from the snow-fed rivers.

109. Q. If such a scheme were practicable, do you think it would be useful for irrigation purposes?—I think it would be very useful, but I don't think it

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would be practicable, because there would be such difficulty in maintaining these channels, when they were made, even if you declared them to be under the Embankment Act, and there would be a series of vexatious cases. The riyats would not preserve them.

110. Q. (Mr. Muir-Mackenzie).—You would have to have some power in the hands of the Collector to oblige these channels to be kept in a state of repair?—Yes, you should have to acquire the lands for the channels first.

111. Q. Is there no hope of the people giving the lands for these channels which would be useful for irrigation?—I think Mr. King could do it, or one of the Maharaja's managers could do it, but I don't think the ordinary zamindars have any give or take to help each other.

112. Q. (Mr. Allen).—Mr. Mackenzie asked you a question about the record-of-rights of streams. Do you agree there is nothing in the present Bengal Tenancy Act to prevent your making such a record-of-rights?—The law permits it. I know nothing against it.

113. Q. (The President).—You have got here a very large zamindari and a number of small proprietors in different places. Are there any particulars on which you cannot get information as regards a large zamindari which you do get about small ones? The reason I ask you this is because there are very large important zamindaris in Madras, and for the purposes of our enquiries we found that there was an absolute want of information which apparently was extremely difficult to get. Do you find any difficulty as regards that?—No. Any information I have asked for from the Maharaja's managers they have given me, and the Maharaja has also done so himself.

114. Q. (Mr. Rajaratna Mudaliar).—What is your guarantee that the figures are correct?—We have got European managers.

115. Q. You have got your settlement records and your revenue records. Are they the same? Are they as full of details for small as for large zamindaris?—Yes.

116. Q. (Mr. Muir-Mackenzie).—Until you compiled your settlement records you were without a great deal

of information which you now have?—Yes, I could not have given you these figures.

117. Q. (Mr. Rajaratna Mudaliar).—Under the bhaoli system what accounts do you keep?—I think Mr. Lloyd would be able to give you the information. He could show you the bhaoli accounts.

118. Q. (Sir Thomas Higham).—There is an extensive programme of tank excavation here; is there not?—Yes.

119. Q. You have made very large tanks, I think all over the district?—Yes.

120. Q. Have they been of any benefit?—I don't think I can say. Some irrigation was done from them last year. I don't think they were made originally for the purpose of irrigation. Mr. King would be able to tell you in regard to the tanks made last year in the famine.

121. Q. Are they filled with water?—They have filled this year probably. They went very low last year.

122. Q. You cannot say whether these tanks have been any particular good?—I find that the sites were not acquired, so that the tanks in many cases have gone back to the zamindars. Now these tanks Government excavated are becoming the property of the zamindars.

123. Q. Do the zamindars make any use of them?—I suppose the riyats use them for irrigation, watering their cattle and drinking purposes.

124. Q. You cannot say whether they do or not?—I should say they do.

125. Q. I suppose there is plenty of water for cattle at any time?—Except in a case like last year, when the rains ceased early; last year the water-supply was very short indeed.

126. Q. It is said that these tanks would be very valuable for the fish they have in them. Do they have any fish in them?—I don't know, Sir. Mr. Onraet could tell us, I think.

[Addressing Mr. Rajaratna Mudaliar, witness said:—You asked me how much was irrigated from tanks here; 45,000 acres are returned as irrigated from tanks.]

Witness No. 40—Mr. R. S. King, Manager, Durbhanga Raj.

Note on Irrigation, Rohika Circle.

Mr. R. S.
King.

30 Oct. 02.

1. In famine of 1897, besides Rs. 50,000 spent in re-excavating tanks in this circle, Rs. 10,000 were expended in some 5-mile channels and temporary dams to lead water from the present Kamla bed into the old beds lying east (which act as distributaries having rains leading from them to the adjacent rice lands). In this way some 25,000 *bighas* of rice crops were saved and *rabi* crops irrigated then.

2. The above channels and 1½ miles more made in May 1901, acted on every freshet during the scanty rains of 1901 (the Kamla comes direct from Nepal valley and hence freshets frequently pass down without any local rain here owing to rain having fallen there or in the lower hills). In this way the full rice and *rabi* crops of some 40,000 *bighas* were secured in 42 villages.

3. After the cessation of the rains about the first week in November 1901, as soon as the water passing down the Kamla had become fairly regular in volume a temporary embankment and weir was started at Narkattia, 11 miles north of Madhubani, and 4½ miles of channels, 15 feet wide, deepened 1½ feet to lead water east to the Jibatch river, along which the rice crops had utterly failed the rains never having been sufficient to make this stream flow. Owing to freshets in the Kamla this embankment at Narkattia was three times washed away during construction and the water could not be turned down the main channel till 12th December 1901, when it first began to flow steadily. This embankment was maintained up to 8th May 1902, when the first heavy freshet swept it away.

4. After filling the Jibatch river-bed from Rarhmalmal to Malangia (about 12 miles) and flooding from it the

field alongside by various temporary dams along its course cuttings were made eastward from it at Keonta, 6 miles north of Madhubani, leading the water into old beds, and the water began to flow along these on 6th February 1902, thus giving water to many villages which were in a very distressed state for want of it for cattle. Madhubani town of 18,000 inhabitants was also given a fresh supply of water when distressed for want of it and cholera rife. Rs. 4,000 were spent on this work.

5. The whole flow of water in the Kamla was diverted down these channels.

I have never seen the Kamla so low before during my 13 years' experience of it. At one time (in A ril) the total flow was only sufficient to fill a channel, 20' wide and 20' deep, with a fall of 2 feet per mile, and there was practically no waste through the weir. (During the famine of 1897 we could never close the waste weir completely, as the flow was at lowest season always double the amount required to fill a channel, 20 feet wide and 2½ feet deep, with a fall of 3 feet per mile.)

A tabular statement is annexed showing the areas irrigated—

	Bighas.
Full crops secured for 1309 F.	40,000
Rabi crop irrigated and tanks filled	5,000
Tanks filled, cattle supplied and seedlings secured for 1310 F.	15,000
	<hr/> 60,000

1. Q. (The President).—You are one of the managers of this Raj?—I am sub-manager of this Raj.

2. Q. How long have you been in it?—Thirteen years.

3. Q. You have a very intimate acquaintance with the people here and have seen them through these years of famine?—Yes.

4. Q. You have managed to frame some relief works?—Yes.

5. Q. We have read with great interest what you have done on the Kamla. Have you a map here?—There is a map here which I think would give it at a glance. This is it (hands it in). It is on an inch to the mile scale, and as

regards the different Sections A, B and C, A is the portion in which the crops have been secured during the last season, B represents the portion in which the *rabi* crop was irrigated and C are the villages which the water reached in February, March and April for filling the tanks, watering the cattle and giving water to seedlings for the current year. (Explained on map.) This *bund* (indicates Narkattia) was begun in November and was finished on the 12th of December. It burst three times before it was finally finished. The *bund* cost about Rs. 1,000 for making and maintaining for six months. There were continual freshets coming down the river and I ran the water into the old beds of the Kamla and irrigated all these crops (shown on map). It was not raised high enough to take it down this channel (indicates) until we made an embankment.

6. Q. Is this (points to it) all rice land?—Roughly $\frac{2}{3}$ of it is.

7. Q. Did they get their *hathia* water?—No; with irrigation water this crop was pulled through; on an average they got 12 or 14 annas of it.

8. Q. You can claim all this yellow (on map) as crops secured and all this green (on map) as crops saved by your *bunds* or channels?—Yes. It was not in time for the sowing of the *rabi*. The *rabi* which was sown was secured, but it was not a full *rabi* crop. The *rabi* was sown in October and the water began to come down here in December. The water was running down this Arah channel. The *dhudoi* and rice and *rabi* were all secured.

9. Q. Suppose none of these channels were made, would all these crops have been lost?—No, I don't think so. In parts you would have got half; on the west you would have had a four-anna or six-anna crop, I think. There would have been scarcity, but I don't think there would have been famine exactly.

10. Q. How many *bighas* or acres do you consider that you irrigated by these means?—It is shown in brief here (map) 40,000 acres of yellow; that is the crop secured. 5,000 of *rabi* irrigated after it had been sown and 15,000 *bighas* of these villages (shown on map) which had water given to them in their tanks for their cattle and for their seedlings.

11. Q. Then 45,000 *bighas* were really irrigated?—Yes. (At this stage Mr. Maddox put in some statistics showing that the outturn of crops on Mr. King's channels was 85 per cent. of the normal, while that on the west of this irrigated area averaged 31 per cent., on the east 22 per cent. and on the south 19 per cent.)

12. Q. So this irrigation quite doubled the value of the outturn?—More than that. It would be multiplied by four.

13. Q. And the outlay altogether was how much?—Including the channel made in 1897 it was between Rs. 13,000 and Rs. 14,000.

14. Q. Did you first make these channels in 1897?—I made this channel (indicates on map Narkattia) in 1897 and also this one here (indicates on map Arah). I spent Rs. 10,000 in 1897 and Rs. 4,000 last year.

15. Q. It was a very successful enterprise, I think?—It was only done bit by bit from practical experience of how the water had been flowing for years with the help of the natives.

16. Q. Now how often did the people want it between 1897—1900? Did you use them at all in 1898 and in 1901?—No. They did not require it then, though, as a matter of fact, this Narkattia channel remained open, because the *maliks* would not allow it to be closed at the top, but it did irrigate with benefit and gave fuller crops.

17. Q. Why would you have closed it?—I would have closed it because I did not think there was any necessity for it, and it would have prevented it from silting. I thought it was needless to keep it open. I did make a *bund*, but the *maliks* would not allow it to be closed.

18. Q. Then the *bund* was not within the Maharaja's dominion?—No. It belongs to a petty *malik*.

19. Q. Now what would you like to do to ensure and improve this irrigation which you have started there? Would you like to put a big weir across the Kamla at that place?—I should be afraid of the Kamla leaving the weir.

20. Q. Where is the place where the Kamla Canal is expected to come out?—Near Jainagar further up here (indicates on the map). About a mile from the frontier I think. I am not quite certain.

21. Q. In fact the Kamla irrigation would not be in your tract at all? It would be away to the east?—Yes.

22. Q. If that canal were made, your area would be cut off from irrigation. In a year of drought your supply would be completely cut off?—Yes. It would be merely transferring irrigation from one place to another. Last year in April the water was not sufficient in the Kamla river to fill my channel fully.

23. Q. In April do you want water for your *rabi*?—If the water was given in October, it would not be wanted in April. In fact the *rabi* in this part of the country does not require any water if there is a full rainfall at the end of the year in October.

24. Q. If the Kamla scheme is carried out, it means crippling your work?—I think, if this Kamla scheme were carried out, the crops protected by it would be secured long before the river would dry up. There would be ample water for everything in October. They would not require water in February and March at all if the crops were secured in October, and there is always ample water then.

25. Q. The Kamla project is for 600 cubic feet a second?—I don't remember.

26. Q. That would not be enough for all the lands to be irrigated?—The waste water in October would do for me. I do not apprehend that the Kamla scheme will take away my water. The crops could be secured by good water before October.

27. Q. What about a dry year?—There are freshets coming down when there is no local rain, and I believe there would be ample water for giving all this here (map) a good crop of rice and the waste water would be sufficient for these channels.

28. Q. (Sir Thomas Higham.)—You would be able to make your *bund* so much earlier?—Yes.

29. Q. (The President.)—I am chiefly thinking of a year of drought?—The river generally rises sufficiently in the previous rains to give ample water for securing these crops before the end of October.

30. Q. October is the crucial month; is it not?—Yes. If we get good water in October, it will secure all the rice which has been planted. In years of the greatest drought such as 1897 and 1902 from $\frac{1}{3}$ to $\frac{2}{3}$ of the rice area has remained unplanted owing to insufficient rain in August and September. That is plenty and gives moisture for the *rabi*. They don't want water after the *rabi* is sown.

31. Q. I must say I cannot see how in a year like 1901-1902 you could irrigate, say, 40,000 *bighas*, and yet have this Kamla scheme in full swing?—The volume of water that comes down the Kamla up till the end of October is sufficient for irrigating the whole district.

32. Q. Our evidence is that the supply is only 600 cubic feet a second. We are told that 600 cubic feet a second is all that we can count upon in October. Forty thousand *bighas* will use up all that?—At the end of October the minimum would be 400 cubic feet and this work may be done before the 15th of October. I think the evidence shows that the river falls very suddenly.

33. Q. A year of extreme drought is what I am thinking of?—I have got a record of the rainfall here for 25 years, and in all the years the river has been full. Freshets have been coming down constantly every fortnight or so up to middle of October, setting these channels going fully and giving full irrigation.

34. Q. You have done so much at so little cost here that I am doubtful whether it is worth while spending ten lakhs on the Kamla scheme?—My scheme is only for one local area. I think a system of *pains* (i.e., channels) north and south would be very useful.

35. Q. You know all about the Dhaus scheme?—Yes, I have read about it. I have known the Dhaus for 16 years.

36. Q. Considering the hold that the Nepal people have on the upper water of that river, is it in your opinion worth spending much money upon it?—I don't think so.

37. Q. Would you reject it altogether?—I am not qualified to say that. The river has been banded not only in Nepal, but also on this side of the frontier in British India. It has been banded off and on for the last 15 or 16 years. I only say that I do not think it is worth spending much money upon, because the water-supply from that river is not much, otherwise they would not have been able to band it.

38. Q. (Sir Thomas Higham.)—In making this *bund* on the Kamla I suppose you employed famine labour?—I had about 500 men working on it.

39. Q. Where did you get them from?—Locally.

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40. Q. Did all the villages interested in it send up men to help?—Yes, but the volunteers were of very little use. They generally arrived about 12 or 1 o'clock and went away at 4 and they asked for some food to eat in the middle of the day.

41. Q. What did you do?—I had to do it by contract work, except of course what was done departmentally.

42. Q. What was done departmentally?—What they call locally *goors*, made with bales of grass and clay wrapped together—the only thing that could be used for a *bund*. In this sandy river all that was done departmentally by daily labour we could not do it by contract work, because we could not get anyone to take it up.

43. Q. You did not get anything like a levy from your villages?—No; we had no *corvée*. We simply asked for volunteers who did very little but look on. If I had depended on the volunteers, the *bund* instead of bursting three times would have burst a dozen times or more.

44. Q. For how many years have you made this *bund*?—The *bund* was made for the first time in 1897 and it was made again last year, 1901.

45. Q. You have not made one every year?—No; it is not required.

46. Q. You have only done it twice?—Yes. Before 1897 the natives said this river could not be banded, or at any rate they had not succeeded in doing it.

47. Q. Which was the easiest, in 1897 or 1901?—In 1901, I think. I had the experience of 1897 then to help me.

48. Q. This *bund* took you four or five weeks?—Yes. It was about 550 feet or 600 feet long.

49. Q. Do you know anything about the floods? Do they have very big floods in the Kamla?—Yes. It is impossible to understand what floods these are without seeing them. The whole country is simply one sheet of water.

50. Q. Is there any spill above in Nepal?—I suppose it does flood there equally, but I have not been up to see.

51. Q. Any canal that came up here (indicates on the map) would be liable to be swept away?—Of course this year it was an abnormally destructive flood, but I have not got enough professional knowledge to say that.

52. Q. You say the whole country is flooded?—Yes, to my knowledge it spills from the frontier down to Mohanpur Ghat.

53. Q. As far as Nepal is concerned something might be done here to shut off the spills?—We cannot shut off any spill in Nepal whatever we do here. I am not aware what the depth of the spill is here. Jainagar is a high land, and I think the spill is chiefly to the west of Jainagar.

54. Q. What happens when a big flood comes down?—This channel (indicates on the map) I had protected with a very high bank at the mouth with spurs after the drought so that the flood did not pass down it save what flowed in from the sides when the country flooded.

55. Q. All the schemes that have been put before us are all worked out on the supposition that as a *sine quâ non* water would be given to the rice in the first 15 days of October, what they call the *kathia*?—Yes.

56. Q. What do you call the *kathia* here?—It varies in the different years. Generally it is the first fortnight in October.

57. Q. During that, part of the time you have got freshets and part of the time you have got no water?—Yes.

58. Q. In 1901, if you had no freshets during that particular fortnight, what would have happened?—It would have been probably an 8-anna crop instead of 14-anna crop.

59. Q. I suppose it had got water before the *kathia*?—Ample water.

60. Q. If, instead of water being given to the rice crop in the *kathia*, it is given up to the 15th of November?—I should say it would secure it from drying up and being a failure. It need not be given in the first fortnight of October. It may be given up to the first week in November. It would then save the crops. I know that from my experience of 1897.

61. Q. (The President.)—Do the people here consider it necessary to run the water off their fields in September?—When they have a normal rainy season they begin running off the water in September; they do not do so in dry years.

62. Q. We were told that on the Sone canals they looked upon it as essential to run off the whole of the water in Sep-

tember, and that then they must have this *kathia* water at the beginning of October?—I think that if they could depend on getting a supply in the *kathia*, they would run it off a great deal more than they do.

63. Q. (Mr. Muir-Mackenzie.)—According to Mr. Maddox, in order to get a real famine in the district, it requires two successive years of failure. Would you say that?—Yes. Well, I should modify that, because we had not two years of failure in 1897; then there was only one year of real failure.

64. Q. Mr. Maddox in his paper points out that the rice crop in 1896-97 was worth only 31 per cent. and only 69 per cent. in the year before. The necessity for the large relief measures was occasioned by their having had a short crop a year before?—I should think it was very much accentuated by their having a poor crop the year before; but we would have required measures of relief probably for $\frac{1}{2}$ or $\frac{2}{3}$ of the actual area even if there had been a full crop the year previous.

65. Q. With regard to these channels that you have made how do you hope to get them maintained?—I had not settled any arrangement for that. I asked the ryats who had got full crops to give me half an anna per *bigha* for the maintenance of the channels, and they have done so after a good deal of delay, and I hold some of the money in hand now for clearing the silt from the channels. Altogether Rs. 1,900 was paid for the purpose.

66. Q. You have no power of calling on them for labour?—No.

67. Q. It depended entirely on their being willing to give the money?—Yes, it was quite optional. The money was only towards the maintenance of the channels, and I proposed it only as a tentative measure. I had enough trouble in doing it, and I do not feel inclined to do it again. There was too much trouble about it for the return.

68. Q. Are they not enough alive to their own interests to help you as regards this?—Once they have secured a good crop they do not care a bit, though while they want water they promise you anything.

69. Q. You said you were able to carry this scheme of yours through from your intimate knowledge of the country. Do you think you might find a good many other places where the same thing might be done if you had time of examining the country?—It would only be after living in the country for some years and going round it that you could do anything. I don't think it would be possible by a simple examination.

70. Q. I mean by a professional man?—A person knowing the levels and who had a contour map might do great deal in this way.

71. Q. Was there much *dhadoi* rice in that irrigated area?—No.

72. Q. It was always an *aghani* area?—Yes.

73. Q. Can you tell me from your knowledge of the country whether the increase of means of irrigation is likely to result in the substitution of *aghani* for *dhadoi*?—I think that the area of *aghani* has increased in this irrigated area since irrigation has been introduced.

74. Q. These works of yours consisted practically, did they not, in the re-opening of silted channels?—My work consisted chiefly in cutting across the silted areas into the old channels beyond the margin of silt from the new channel.

75. Q. The disused channels were owing to silting caused by floods?—Yes; my experience of the Kamla is that it throws silt for about 1½ miles.

76. Q. Have you any cases where the channels become disused owing to the erection of embankment to prevent floods?—No.

77. Q. Do you do anything in the way of well irrigation?—In one village only. It is a large opium growing village.

78. Q. And the other villages are they unsuited to it?—There is no demand for it. The *kachcha* wells fall in almost at once.

79. Q. In this opium village are the wells all *kachcha*?—No, they are *pakka*. I have given them money to make them. It is a village of very high level and does not get water from flooding at all.

80. Q. And in these villages, which are of low level, do you think nothing useful could be done from wells?—I don't think so.

81. Q. Not even if wells were made for the growth of the valuable garden crops?—Very little of such garden crops is grown in this area. There is very little tobacco or such crops grown there.

82. Q. On what terms do you give your advances for wells?—We have given the money for wells simply as a present to them.

83. Q. You get no return?—They pay their rents regularly and they are good rayats. It was given as a matter of benevolence from the Mahamja.

84. Q. You get no increased rent?—We get a full rent for the opium lands, but it is not a specially high rent.

85. Q. It is not enhanced?—In no way on account of wells.

86. Q. (Mr. Rajaratna Mudaliar).—On the lands irrigated by the channels you constructed in 1897, do you not levy any water-rate or any enhanced rent?—No.

87. Q. These 45,000 *bighas* are irrigated free, without any charge?—Yes.

88. Q. You have power to enhance the rent. Could you not have levied an extra charge?—I could have, but we did not ask for it. All we ask for is regular payment of the rents. The Mahamja has been very generous to the rayats in such matters and we have dug tanks and made wells in that way.

89. Q. You don't endeavour to recoup yourself, or obtain at least the interest on the outlay?—No. Within the last year I have refused in some cases to make embankments, because I found the rayats took no care of them once they were made, and relied on us to make good many damages. So now I lend them money to make embankments; when they themselves make the embankments they take greater care of them, I find.

90. Q. Do you charge any interest on these loans?—At 12 or 12½ per cent., which is two annas on the rupee. The rayats understand it as a simple way of calculating. We lent them money in 1897 at 4 per cent. and found they did not want to repay it, because it was at such low rates. They paid their *mahajans* some of this money and then asked for more money, because they could get it cheap, and I have recommended to the Maharaja not to lend money at less than 12½ per cent.

91. Q. (The President).—Is that about the *bania's* rate?—The *bania's* rate is 25 per cent.

92. Q. (Mr. Rajaratna Mudaliar).—On the land irrigated by your channel in 1897 you would have lost the rent but for the channels?—We could not have collected it in 1897-98. It would have had to have been postponed.

93. Q. I suppose you would not have succeeded in getting it all?—Probably we would have lost one-fourth of it.

94. Q. What was the cost of the channels?—In 1897 there was an expenditure of Rs. 10,000, including an embankment. The embankment cost Rs. 2,000 and the channels Rs. 8,000.

95. Q. You said that owing to the obstruction of a *malik* you were unable to extend your channels?—I was unable to close it. It was not the *malik* in whose land the channel was on, but an adjoining *malik*. He would not allow a spur to be made at the end of the embankment; hence the water swept round it and cut it away.

96. Q. In the case of these channels did you find any difficulty owing to the want of provision in the law for

acquiring land in carrying out such work?—Through personal acquaintance with the locality, the rayats and the adjoining petty *maliks*, I find no difficulty. They have such confidence in us that they give us the lands. I have generally been able to persuade them.

97. Q. Do you think it would be an advantage to amend the law, so that, if there was a refractory tenant, you could compel him to give up the land?—We have not any question with the tenants, but only with the adjoining *maliks*. If we have to carry a distributary through some tenant's land, they generally give the land up willingly and we take it off the rent roll.

98. Q. (Mr. Muir-Mackenzie).—Do you think Government would meet with no more difficulty than you do?—I don't think so. I think the people would have more confidence in Government, and that the Collector could persuade them to give up the land.

99. Q. (Mr. Rajaratna Mudaliar).—You have given some advances to tenants to make wells. In these cases also do you give them free of any increased rent?—Yes.

100. Q. (Mr. Allen).—You spoke just now of Government being able to do this kind of work. Would not the tenants, as a matter of fact, want Government to pay much more than you pay?—They would undoubtedly do their best to get every pice they could out of Government.

101. Q. Do you think any Government officer would be able to carry out a scheme of this kind in the way you have done it? Is not this a case of your own personal influence?—I think it would require a man of experience and a great deal of application and time. You would need to have a special man for that one work alone.

102. Q. You have not anything like a water-rate here?—No. It was only levied once last year as a tentative measure, and I found so much difficulty and bother that I have decided not to have anything to do with it again.

103. Q. You don't levy any water-rate?—No.

104. Q. What is your opinion about that? Do you think the people would pay, say, Rs. 2 an acre for water in a dry year?—In a dry year they would pay Rs. 2 to get their rice crops in when they saw there was no chance of getting it in through the rains. At the last pinch they might do it, but they would not do it universally. Possibly 50 or 60 per cent. would do it, but I don't think they would pay unless put to the very last pinch about it.

105. Q. What is the rate of rents about that part?—About Rs. 4 per *bigha*.

106. Q. So that, if levied, the water-rate would represent about 50 per cent. on the rent?—Yes.

107. Q. Would there be any chance of people paying that every year?—No chance at all.

108. Q. The enormous benefit you have caused in this country would only be felt in years of drought; you would only require it once in four or five years?—Yes.

109. Q. Is it not a permanent benefit?—It is a permanent benefit in opening up these river-beds, for since the channels were made in 1897 these villages (indicated on map) have had fuller crops than the adjoining villages. It means a difference of ½ to ¾ in the crops.

110. Q. Even in a year of good rainfall?—Yes.

111. Q. In a year of good rain you close these channels?—I close these running down here, Karh Mahmal (map); this one (map), Arerh, I have left open. It is a 16 feet channel.

Mr. R. S.
King.

30 Oct. 02.

WITNESS No. 41.—BABU GHURAN SINGH, Collectorate Sherishtadar and Rayat of Jogiyara.

1. Q. (The President).—You are a resident of this district, I understand?—Yes.

2. Q. Do you know the agriculture of the district; you have cultivated land of your own?—Yes.

3. Q. Do you think the country requires artificial irrigation introduced into it?—Yes, it does.

4. Q. In what parts?—The northern parts especially.

5. Q. It would not require it every year?—No.

6. Q. About how often?—Every third or fourth year regularly.

7. Q. Would the cultivating classes be willing to pay for it?—I don't think so; the well-to-do persons would be able to pay, not the poor.

8. Q. But they would gain something by it?—In that case they would pay.

9. Q. If a man gets water he will get a better return; is it not reasonable that he should pay something?—Yes.

10. Q. They pay a road cess in this district?—Yes.

11. Q. Every year?—The rayats pay the *maliks* and the *maliks* pay Government.

12. Q. Would they be willing to accept an irrigation cess of about a quarter anna on the rupee?—They may.

13. Q. Every year?—Yes.

14. Q. Or would they prefer paying a larger water-rate when they use the water?—No; an irrigation cess would be much better.

Babu
Ghurana
Singh.

30 Oct. 02.

- Babu Ghuran Singh.*
30 Oct. 02.
15. Q. Have you seen the country near the Kamla river which Mr. King has irrigated by these cuts?—No.
16. Q. Do you know the country on the Dhaus?—No.
17. Q. Is there much irrigation done by *pains* from the rivers in this district?—Yes.
18. Q. Have these led to many disputes?—Yes; sometimes one rayat does not allow the water to go into the lands of another rayat.
19. Q. Do they go into Civil Courts?—Yes, and also to the Criminal Courts.
20. Q. Do you think it would be a good thing if the Collector had power to deal with these cases?—Yes; it would be much better.

21. Q. Is there any money spent in keeping these *pains* clear?—No. When there is a dry season they are dug, and when the season is over and the lands irrigated they all fill up; these *pains* are worthless; the big *pains* excavated by the Maharaja are somewhat useful and lasting.

22. Q. I see a great many tanks in this district; are they used for irrigation at all?—Yes; sometimes the *maliks* don't allow it.

23. Q. Are they kept for watering cattle?—Yes; when there is scarcity of water the *maliks* stop other rayats from using the water even for cattle.

WITNESSES NOS. 42, 43 AND 44.—MR. S. ROUT, MR. GURU CHURN SINGH AND MR. PREMASWARI ROUT, Cultivators of Balia.

- Mr. S. Rout, Mr. Guru Churn Singh and Mr. Premaswari Rout.*
30 Oct. 02.
- (To the President.)—Last year the rainfall here was scanty and the cultivation suffered very much. Rice is our chief crop. Last year the crop was less than four annas. If a canal was made we would take water. The Nepalese bund the water, or we would make our own canals. We sometimes pay the Nepalese to cut their *bunds*. Mr. Wilson, Manager of the Chaurant Mahant, has made a canal from which we get great benefit. We pay the Nepalese Rs. 5 or Rs. 10 to open their *bunds*. If Government makes a canal, we would pay when we took water, but the people would not like a permanent cess.

If there is no rain in the *hathia*, it is a waste of time to work at our crops. If there is no rain in the *hathia*, but there is rain in Chitra, it is useful, but it is not the same thing.

In the *hathia* this year there was some water, but last year it was almost dry, and we lost our rice except where we lifted water on to the lands from tanks. Last year we could not make arrangements with the Nepalese, as they wanted the water for themselves.

WITNESS NO. 45.—MR. A. S. SHERMAN, Farmer, Jainagar.

- Mr. A. S. Sherman.*
30 Oct. 02.
1. Q. (The President)—Are you a planter?—No; I am a farmer.
2. Q. Near the Kamla river?—Yes.
3. Q. You have heard about the proposed canals from the Kamla; would they benefit your lands?—Yes.
4. Q. The estimate is about 10½ lakhs of rupees; one cannot expect Government to spend that money unless there is some return. Do you think the people would like to have a water-rate for the time they used the water, or would they prefer an annual cess like the road cess?—I think they would prefer to pay an annual cess.
5. Q. Do the people about this district wish to have irrigation?—Yes.
6. Q. Is there any point you would like to represent about irrigation in their lands and how they could be benefited?—They would benefit by a canal.
7. Q. Have you known the Kamla river for a great number of years?—Yes.
8. Q. Is it ever banded in Nepal?—Yes.
9. Q. Is water stopped altogether?—Yes.
10. Q. Does that often happen?—Yes.

11. Q. (Sir Thomas Higham.)—They don't bund the whole of the water up?—Yes, the whole.

12. Q. (The President)—Are they in the habit of doing that pretty often?—Yes.

13. Q. Are you referring to the main Kamla river?—Yes.

14. Q. Is it often banded up by the Nepal people?—Yes, and it is also done by a *mahant*.

15. Q. In British territory?—Yes.

16. Q. Do the Nepal people close the river altogether?—I have heard so.

17. Q. (Sir Thomas Higham.)—Is it ever dry?—Yes.

18. Q. When?—In April and May.

19. Q. (The President)—Do you think they would bund it at the time of the *hathia*?—No.

20. Q. Why?—Because there is too much water.

21. Q. (Mr. Allen.)—Do you think it would be quite impossible for the Nepalese to bund it in October?—Yes.

22. Q. Why?—Because the river is already rising.

23. Q. Do they ever begin before April to bund the river?—Yes, at the latter end of March.

24. Q. Not before that?—No.

WITNESS NO. 46.—MR. P. T. ONRAÛ, Manager of Zamindari.

- Mr. P. T. Onraï.*
30 Oct. 02.
1. Q. (The President.)—You are a landowner, I understand?—I am the Manager of the Madhubani Estate.
2. Q. Would your lands be benefited if the Kamla Canal were made?—If the Kamla Canal were extended to the Bolan so as to connect the two rivers and distributaries made to the west of the Bolan.
3. Q. What about the Bolan having moved six miles?—The big Bolan has not moved six miles in my zamindari; it used to go near Lokhai, but now the Bihool and Bolan have become one river. A great portion of the Bolan river runs through the north-east portion of the district and has remained stationary for a great number of years.
4. Q. Are the lands, you are interested in, on the banks of the river?—Yes, some of them are.
5. Q. Does it cause you any anxiety?—No; what it cuts on one side it makes up on the other.
6. Q. Do you know anything of the Nepalese bunding the Kamla?—No; I have heard of it casually.
7. Q. Have you reason to believe that in the Kamla river there would always be a supply of water for irrigation there at the time that it is required?—Yes.
8. Q. October is the most important month here?—Yes, and end of September.
9. Q. Supposing irrigation works were carried out, would the people be willing to pay a water-rate or

have a cess?—I think myself that a water cess would be the best thing, but the poorer rayats who have no paddy lands would grumble at having to pay it; they would gradually get used to it.

10. Q. Is the road cess much in this district?—Half an anna on the rupee.

11. Q. How should a work like this be carried out; under the Public Works Department, or should the local authorities manage it?—It is going to be a big work, say the making of a number of distributaries, it should be done by the Public Works Department; if it is a small thing like the bunding of existing channels, it might be done through the District Board.

12. Q. (Sir Thomas Higham.)—Do you know anything of the land on the Kamla? Is it liable to be flooded by spills?—No. Bolan No. 2 is the one that affects my zamindari.

13. Q. You don't know whether that country is ever under spill?—I have heard that when the Kamla river does spill it comes to Madhubani, but I have never traced the source of it.

14. Q. (Mr. Muir-Mackenzie.)—Is it possible to do very much in the way of bunding up irrigation channels?—Yes, I think so; there are nullahs that cut into little Bolan No. 2; if embankments were made across them and the water kept as in a reservoir, and small *pains* made, irrigation could be carried on.

15. Q. Why has nothing been done hitherto?—Because the zamindars don't care to spend money; they cannot get anything more from the rayats, and the rayats are too apathetic to spend money.

16. Q. If a rayat got an increased produce, could not the zamindar get anything out of him?—The rayat objects to pay anything that is not down on his *jamabandi*.

17. Q. Would he not get something down in his *jamabandi* on account of an improvement made?—It might be done, but not willingly; not without recourse to law.

18. Q. Supposing you have a bad *hathia* and were given water not later than the first week of November, would it not save the crop?—If there had been scanty rain before, the rice would be all parched up.

19. Q. You don't try bunding up your rivers in years of scarcity?—Only perfunctorily. I have not

made channels like Mr. King. I think that is a very good thing.

20. Q. What has prevented you doing it?—It is a matter of expenditure.

21. Q. Have you had famine in your part of the world?—No; not even in 1897.

22. Q. You didn't have occasion to employ relief labour?—Government only made three or four tanks.

23. Q. Were they useful?—Yes; they irrigated largely from them this last season and pumped them dry; the tanks saved many acres.

24. Q. Were they dug primarily for cattle?—Most of our tanks have been dug from a religious motive originally.

25. Q. I refer to work done in the famine?—It was first for the sake of famine relief work; they will do for cattle-watering purposes in future.

Mr. P. T.
Onract.
30 Oct. 03.

WITNESS No. 47.—Mr. A. W. WATSON, Sub-divisional Officer, Madhubani.

1. Q. (The President.)—You are in charge of a sub-division in this district?—Yes.

2. Q. Have you been long here?—2½ years.

3. Q. You were here throughout the last famine?—No. I joined in 1900. There was only scarcity last year. I was away from August to November. The scarcity, however, did not develop till after November.

4. Q. Where is your sub-division?—In the north-east, 24 miles from head-quarters.

5. Q. Is the Kamla scheme in your part?—It will run through my sub-division.

6. Q. Is there any wish for irrigation there?—As a matter of fact, the rayats are entirely apathetic; they clamour for water when there is scarcity, but they are never willing to do anything on their own account; they expect you to provide even labour.

7. Q. Have there ever been any famine relief works since 1896-97?—There was a special District Board work in the north-east during the spring of the current year.

8. Q. Did that draw?—Not much.

9. Q. Was there dire need?—No; there is always a submerged tenth bordering on distress.

10. Q. So there is in London. Would these people accept a water cess?—If introduced gradually I think they would.

11. Q. Probably it would not exceed half an anna on the rupee?—Of course the vast proportion would not at first willingly accept anything, but they might be induced to do so gradually.

12. Q. Would that be better or worse than a water-rate?—I think a cess would be much more satisfactory. In the three rains that I have known here there has generally been a break about twice in 20 days; and during these breaks rayats would be glad to take water even in normal years. They would not really want a large quantity of water more than once in four or five years.

13. Q. Is there any land in your sub-division under well irrigation?—Very little, and that is confined to opium. This is in the north adjacent to the Nepal frontier.

14. Q. Is there any demand for wells up there?—No; I don't think so.

15. Q. I suppose the opium people give advances?—Yes, to their own people.

16. Q. The famine relief programme is kept up at the head-quarters of the district, I suppose?—Yes, the Collector has it.

17. Q. (Mr. Muir-Mackenzie.)—Are you consulted as regards works to be put into it?—Yes, as regards my sub-division. While on tour Mr. Maddox and I made enquiries about possible channels.

18. Q. Do you suppose, if you remained several years and carried out these works, you could find other things of the same kind?—The difficulty would be with the smaller landlords who are extremely non-public-spirited; with the exception of the Maharaja, nobody would give land for channels.

19. Q. Would the acquisition of land be expensive?—Yes, very.

20. Q. Have you power to distribute *takavi* advances?—No. Some applications were made to me this

Ben.

year; most of them proved to be *mala fide*. Numbers of people came in after Mr. Maddox's visit to the distressed area in the north-east, in the hope that money would be got.

21. Q. How far did the people come?—Many from nearly 60 miles.

22. Q. They would not consider 60 miles too much if they thought money was to be had?—No, certainly not and they paid Re. 1 and Rs. 2 to *mukhtars* for writing applications; many intended to lend out the money to others at a higher rate of interest.

23. Q. As regards well irrigation for opium, do you suppose that would have been done if the opium people did not appreciate it?—No, opium cultivation has been pushed a good deal.

24. Q. They have also pushed irrigation?—Yes, no doubt.

25. Q. Has the increase in cultivation been largely due to irrigation?—I think so; it has proved very profitable.

26. Q. Would advances be largely availed of for land improvement purposes?—I think so.

27. Q. For really *bona fide* purposes?—Yes, provided the officer took sufficient trouble in the matter; the people would require constant supervision.

28. Q. Is there any sugarcane grown?—Yes.

29. Q. Without irrigation?—Yes, a good deal is without irrigation. One factory has taken to irrigation last year.

30. Q. How did they get irrigation there?—They lifted out the water from a neighbouring river and ran it in small channels.

31. Q. Previously had that land grown sugarcane without irrigation?—Previously it had been indigo land.

32. Q. Do you know the area of this irrigated sugarcane?—It is not very great.

33. Q. Not 100 acres?—Perhaps a couple of hundred acres.

34. Q. Besides that there is a good deal of unirrigated sugarcane?—Yes, a good deal—some 8,000 acres.

35. Q. (Mr. Allen.)—Do you know about this scheme of Mr. Maddox's—the Belul and Karak scheme?—Yes.

36. Q. Was there scarcity last year?—Yes, along the frontier line from Lokahi to the north-east end of the district.

37. Q. Did you discuss this scheme with the natives?—No, but I got all particulars concerning it from Mr. Rennie, Raj Sub-Mannagor, in that area.

Q. 38. (Mr. Muir-Mackenzie.)—Is there much scarcity in Nepal? Do the people ever come over to your side?—Sometimes, and sometimes our people go over there.

(Mr. Maddox.)—I think our men are more likely to go to Nepal.

(The witness.)—A great many of our people go to Nepal, especially in the *ghan-cutting* season. We are not bothered with immigrants, but only with habitual thieves from across the border, who constantly commit burglaries on our side.

Mr. A. W.
Watson.
30 Oct. 03.

Witness No. 43.—Mr. J. H. KERR, Settlement Officer, Durbhanga.

Mr. J. H. Kerr. 1. Q. (*The President*).—You are Settlement Officer in this district?—Yes.

30 Oct. 02. 2. Q. Have you been long here?—Yes, four years; one year as Sub-divisional Officer in Madhubani.

3. Q. I suppose you know the whole of the district?—Yes.

4. Q. Have settlement operations been going on all through the year?—Yes, since 1897; they are just finished now.

5. Q. What is your opinion about providing for the recurrence of future famine; a country like this suffers from extreme scarcity at intervals; should not irrigation works be provided?—Yes, if possible, to do it at a reasonable cost, it would be an excellent thing.

6. Q. Would the people take to it?—People would take as much water as you gave them if the *hathia* failed, but in an ordinary year they don't require it and would not pay.

7. Q. Are you familiar with the north part of the district?—Yes.

8. Q. Are the streams steadily banded in the Nepal territory?—Yes, the Dhausa; I have never seen the Kamla absolutely dry.

9. Q. Have you any sort of relations with the people across the frontier?—Nepalese Subadars sometimes come across to see us.

10. Q. Are they friendly?—Some are; some are very haughty.

11. Q. Do you think there is room for carrying on irrigation works as a source of benefit to the Province?—Yes, certainly.

12. Q. This difficulty about the bunding is a very serious one?—The Kamla could not possibly be banded in the rains; perhaps it could be banded in October; certainly not in September.

13. Q. As regards levying a cess in return for water given, do you think that would be accepted without a tremendous struggle?—It would require legislation.

14. Q. Assuming that there was legislation?—I don't know about the people who are not benefited by irrigation; the cess could only apply to the tract where irrigation was effected; then there would be villages in that tract which could not get water, and there would be rayats whose holdings were composed of lands that could not be reached by irrigation and these would have to be excepted.

15. Q. (*Mr. Muir-Mackenzie*).—These statistics of irrigation given by Mr. Maddox; are they taken from your Settlement Report?—Yes.

16. Q. The great bulk is in the Madhubani Sub-division. What is the difference in the conditions of that district from the rest?—Irrigation is available; there are more rivers. In the Sudder Sub-division there are more *jhils* where the water logs.

17. Q. You said that there would not be any willingness on the part of the people in ordinary years to pay a water-rate?—Yes, I think the rayats would take water in an ordinary year, but would not pay for it.

18. Q. Mr. King said about 2 to 4 annas might be gained in profit?—Even if this is correct, I don't think it would induce the rayats to pay for water in ordinary years.

19. Q. Don't you think it is right they should pay?—Yes, if they benefited: e.g., if the water enabled them to plant out earlier than would otherwise be possible.

20. Q. That would be of use to them?—If they do take water at all, I think they would prefer to hang on to the chance of rain.

21. Q. Mr. King said they would take water?—I don't think they would take it if they had to pay.

22. Q. Do you think there are a number of places in the district where irrigation could be improved from existing channels and new channels extended?—I am not competent to say. I think that would be the best thing. I think, if something more could be done in the way Mr. King has done things at small expense, the practical effect would be better.

23. Q. Madhubani does not seem to have been the most distressed district?—No.

24. Q. (*The President*).—Are there tracts that we are so full of water dry in the famine year?—I don't know. I was not here. I believe so.

25. Q. (*Mr. Muir-Mackenzie*).—Over the existing rights of water in these private irrigation works there are many disputes; are there not?—There are disputes over the bunds.

26. Q. You don't record the rights?—No.

27. Q. Do you think it would have been a part of your business to do so?—I doubt if the rights are sufficiently determined.

28. Q. Would it be a good thing to enquire into the matter and record the rights?—I am not clear what there is to record. This place is not like Gya where rights are fairly well defined.

29. Q. Would it be worth while to record them in districts where they are sufficiently determined?—Yes.

30. Q. They would save disputes?—Yes.

31. Q. (*Mr. Rajaratna Mudaliar*).—Have you power under the present law to enquire into rights in water and prepare a record of these rights?—We record fishery rights. We are not told to record rights in water.

32. Q. (*Mr. Muir-Mackenzie*).—There are no legal obstacles in the way?—No.

33. Q. (*Mr. Allen*).—Do you know the Gya District?—Yes.

34. Q. If it was proposed to give the Collector power to summarily decide disputes regarding channels, do you think it would be good, or would you wait till the record-of-rights of different people in the channels had been made? Do you think the Collector would be able to decide disputes in the absence of the record?—If he personally enquired into every dispute himself.

35. Q. Ordinarily speaking he could not do so?—No.

36. Q. Could he get at the truth by sending out a subordinate?—I think he would be greatly assisted by a record.

37. Q. It has been proposed that the Collector should be given power to compel the landlord to maintain the *gillandari*, where they neglect to do so; would that be practicable? It was proposed that he should be given an allotment and carry out the work himself and recover from the landlord?—I think it would be to the benefit of the landlord.

38. Q. Would the Collector do that in practice, if it was supposed that the zamindar was not maintaining the irrigation works properly?—I don't see why he should not do so.

SIXTH DAY.

Durbhanga, 31st October 1902.

Witness No. 49.—Mr. H. A. RENNY, Sub-Manager, Durbhanga Raj.

Mr. H. A. Renny. 1. Q. (*The President*).—I understand that you are a resident of this district?—Yes.

31 Oct. 02. 2. Q. Have you been here a long time?—I have been here 22 years.

3. Q. Have you an intimate acquaintance with the northern part of the district?—Yes. I have always been stationed there.

4. Q. That is the part that is most liable to drought and scarcity?—Yes, the northern portion of it is.

5. Q. There were two schemes discussed yesterday—the Dhausa and the Kamla. As regards the Dhausa, a very important consideration seemed to me that the Nepal people could turn off the water whenever they pleased, and that just at the time it would be most necessary in this

district, it would be most necessary in Nepal; and that, therefore, we could not count upon the water when it was wanted most. Would that be your own experience?—That is not my experience. I have never known water not available. There are five rivers running through my pergunnah, and they are all more or less fed from Nepal. I am not now talking about the Dhonse, but about the rivers in Phulparis. The rivers I am acquainted with are these running up to the Barra Bolan.

6. Q. You say that the Nepal people never bund these rivers?—I have never known them to do so. They are, too high, I think, to be banded.

7. Q. (Sir Thomas Higham).—Supposing you were to make works here, what is to prevent the Nepalese bunding the rivers hereafter?—I fancy we have got no control over them at all.

8. Q. If we taught them how to bund rivers here, they would probably follow our example and do it there?—I dare say they would.

9. Q. (The President).—Is the want of irrigation seriously felt in this country?—It has been felt on more occasions than one. In the famine of 1874 this portion of the district was the chief seat of it, and last year, if it had not been for rain in March and April, there would have been another severe scarcity.

10. Q. I suppose people would not take water every year?—Most of them would take some water on the high lands.

11. Q. For their rice?—For their rice and for their *rabi* and for their *khadoi* too.

12. Q. And would they be willing to pay for it?—When I sent up the project as an original project, they were willing to pay four annas an acre.

13. Q. As a water-rate?—Yes.

14. Q. That does not give very much?—No.

15. Q. Do you think they would accept a cessment?—I cannot say. I have not sounded them on that point. I have not contemplated a cess. I have always thought of a water-rate.

16. Q. Do you think there would be a demand for water oftener than once in four years?—I think it would be oftener.

17. Q. Have any engineers ever been up here and looked at it from an irrigation point of view?—Before my time Mr. Finucane, who was here, started a scheme which you have seen, and subsequently Mr. Barton has been all over the pergunnah.

18. Q. Is any one of them which you would particularly recommend?—I think Mr. Finucane's project would be the most useful one.

19. Q. (Mr. Muir-Mackenzie).—What was Mr. Finucane's scheme?—The Baikul-Karang scheme.

20. Q. (The President).—I think, in the absence of any thoroughly worked out scheme, what we have chiefly got to

do is to enquire whether it is necessary or desirable to have irrigation there and to spend a certain amount upon it, whether the water is available and whether the people would appreciate it enough to pay something for it. If these points are settled in favour of the irrigation, then we would say there is a *prima facie* reason for taking the thing up and examining it thoroughly. You say the Nepal people have never banded up these rivers?—I have never known it.

21. Q. You say the people would pay a water-rate of five annas an acre?—Yes.

22. Q. You cannot say whether or not they would consent to any cess?—I have not gone into the cess question.

23. Q. And do you think distinctly that it would improve the situation very much if there was irrigation?—Very much.

24. Q. And it would increase the value of land?—It would increase the value of land and bring it more under cultivation.

25. Q. Is there much waste land?—There is a good deal in the northern part.

26. Q. The rivers are large ones?—The Bolan is a very large river; the Panai is a large river; the Bihwal is not a large river.

27. Q. Is it the case that the Bolan has moved 6 miles?—It has moved 6 miles and now it has amalgamated with the Bihwal.

28. Q. Do these rivers sprawl over the country, or have they their own beds?—They have got their own beds, and that is what makes the project so much easier I have thought.

29. Q. The Bolan has not kept to its bed?—No. All the others have kept to their beds.

30. Q. Is there much *rabi* cultivation?—To the western portion of the pergunnah; there is not to the eastern portion.

31. Q. (Mr. Muir-Mackenzie).—About the movement of the Bolan do you know where the movement commenced? Has the movement taken place south or north of Saswa?—North of Saswa.

32. Q. (The President).—Sir Thomas Higham suggested that if Nepal should take it into their head to bund up these rivers, there is nothing to prevent them?—I have already answered that question. I am not sufficiently acquainted with Nepal, but during my experience of 22 years there has been no difficulty of that kind.

33. Q. What one would like to know is whether there would be any inducement for Nepal. The question is whether they have the cultivation there?—They have got the cultivation. They have got the *dhan* country running along the foot of the hills.

34. Q. (Mr. Allen).—Is it within your knowledge that rice cultivation is spreading in Nepal?—No, I do not think so.

Mr. H. A. Renny.

31 Oct. 02.

Witness No. 50.—The Hon'ble Mr. D. B. Horn, Chief Engineer to the Government of Bengal.

1. Q. (The President).—You have heard all the evidence given at Bankipore by Mr. Toogood and other engineers. Are there any points in which you disagree with them?—No. I think all their evidence is very accurate.

2. Q. I wanted to get out what the country would have to pay for the luxury of navigation in the Sone Canals, and I understood it was about 20 per cent. of the total?—That is about the nearest approximation, I think, we can make. Navigation added about 25 per cent. to the cost of the Sone Canal. The locks cost about 30 lakhs, and I should say we could easily put down at least 20 lakhs more for other savings. Then for maintenance there must be a large percentage. There is all the lock establishment, and renewal of lock gates, etc. Gate renewals are very expensive. The cost is not so much in the Sone Canals, as it would be in the tidal canals. The destruction of gates in tidal canals is very great.

3. Q. We asked Mr. Toogood whether navigation was very much appreciated on the Sone Canals. He said "yes, the people like it." But his answer was given in a manner which led me to believe he was not very enthusiastic over it, and that he did not take it as a very great boon to the country. Do you consider it has been appreciated largely?—I don't think so. Of course it has been a convenience to the people to

have steamers running up and down the canal prior to the introduction of railways to the south. I might, however, say that, as far as the navigation is concerned when I was at Buxar in 1887 I built a new *gola* at Sassaram and exporters would not use the *gola*.

4. Q. What do you call a *gola*?—A store-house for grain. I thought exporters would bring their grain to be packed and sent down to Buxar by canal. Instead of this I found they used carts and conveyed the grain down the Grand Trunk Road to Zamania in preference to the canal. I asked them why they did this, and they said "we have got our bullocks and we have got nothing for them to do. We prefer to use them instead of paying canal tolls."

5. Q. (Sir Thomas Higham).—Do you have bullock traction on the canal?—No. It is all by hand. Navigation has been an absolute failure. I think, if we had made only one line navigable, it would have been sound; making all three canals navigable was a great mistake.

6. Q. (The President).—About irrigation, you say the leases are taken up very readily?—Very readily, and of course the conditions are becoming more and more severe; we are getting more and more particular every year about the channels being properly kept up, and lease boundaries.

Mr. D. B. Horn.

31 Oct. 02.

Mr. D. B.
Horn.
31 Oct. 02.

7. Q. What is exactly the basis of all leases?—We select a block. It may be all in one village, or it may be part of a village. If we have a very big village commanded by two or three distributaries, we may have several blocks in it.

8. Q. Would it embrace several villages?—No. As a rule we confine a block on the Sone to one village.

9. Q. You have got varying rates of irrigation according to the crop?—Not for the blocks. We have one uniform rate; inside the block a man can grow sugarcane, rabi and rice.

10. Q. What does he pay you?—He pays an all-round rate of Rs. 2-8 per acre for the block. If he wants hot-weather irrigation for sugarcane, he has to pay an extra hot-weather rate.

11. Q. In the event of irrigation being very popular, and there being a demand for it, would it be an easy matter to raise the rates for the new leases and make it Rs. 3 instead of Rs. 2-8 per acre?—We mean to do so when the existing seven-year leases fall out. I think they fall out next year.

12. Q. The whole of them?—A certain number will. We started seven-year leases in 1897. Formerly they were for five years.

13. Q. That will bring you presumably a considerable increase of revenue. Do you suppose it will choke off many of the leases raising the rent?—I don't think so. Our position is very strong. The villagers have got so accustomed to water and have realised its full value that I don't think we shall have any trouble at all. We increased the rate about seven years ago and there was no diminution. If you look at the list for the last 10 years, you will find that the leases are steadily increasing in number.

14. Q. What proportion of the whole irrigation is by lease?—I think about 85 per cent. Rabi irrigation varies enormously according to the season. The irrigation I am talking about is *khari*. There is a proportion of rabi and sugarcane in the leases. They have got the right to grow rabi under the lease. When we started first of all the rabi area was very large, but when the villagers found that they were always ensured a supply of water, they have gradually converted rabi lands into rice lands.

15. Q. Is the sugarcane on the increase to any extent?—I don't think so. Sugarcane irrigation is not very much; we are restricted in the hot weather for supply. The Sone runs down to almost 300 cubic feet a second in May.

16. Q. To go back to my former question, what proportion of the irrigation is by lease; about 85 per cent. you say?—I should say quite that of the *khari* area is under long lease. You heard, Sir Thomas, that the people are getting too much water. I was very pleased to hear that. When we had the Irrigation Committee in 1887, things generally were all the other way; that is to say, we were accused of not giving sufficient supply. We shall have to proceed very cautiously with the Shahabad cultivators. They are very troublesome.

17. Q. I gather it is not the policy of the canal authorities to fill the *ahars*?—Not at all. That is how we came to such trouble at first. We admitted water into a little undefined channel running into the lease, and what the villagers did was to let the water into their *ahars*, and then when we tried to assess the lands, they refused to pay and said "this is not your water; it is rain water," and we had no proof it was not. Then we adopted the policy of no leases except to good blocks with defined village channels.

18. Q. If they came to you and said "we want to fill these *ahars* for what will you do it?" When you have water going to waste you may just as well store it in the *ahars*?—We do fill *ahars* when we are closing the canal in the hot weather. We put water into the *ahars* for drinking purposes and for cattle.

19. Q. Might it not pay these people and add to your revenue, if you said "our leases are at Rs. 2-8 per acre; besides that, if you have got an *ahar*, we will keep it filled for you for so much"?—We have almost got our limit now, and all our five-year leases are irrigated from proper channels and proper outlets.

20. Q. Do you think they would not irrigate further and would not make their blocks bigger, if there were store-houses for water in the shape of *ahars*?—I don't think so. It is a wasteful system of irrigation.

21. Q. I entirely agree with you that it is a wasteful system of irrigation in a case of short supply of water. But in a year when there is Sone water going out into the Ganges, it might be just as well as to store

it, instead of letting it go to waste?—We don't waste any water.

22. Q. During the floods?—We close down.

23. Q. During the last year of scarcity, if your *ahars* had all been full, they might have pulled you over this difficulty. Would it not have been an advantage?—We have had a bad experience of *ahars*. There is constant friction between the villagers and ourselves about losing control of our water.

24. Q. (Mr. Muir-Mackenzie).—How exactly do you lose control of the water?—At first we allowed water to leak with imperfect village channels, and the villagers used to take it down into these *ahars* and irrigate their land which was not within the lease at all. When we tried to assess them, they said, "it is not your water; it is rain water." We could not prove it was not rain water. There might have been rain water in the *ahar* in an ordinary year.

25. Q. Could not you give water to the *ahar* on condition that any new area irrigated from the *ahar* was charged for?—I think all the area pretty well commanded now is under lease. I also understand that the *ahars* are falling into disuse.

26. Q. It is in evidence that you may have a large surplus of water in the early part of the year, and then at the *hathia* when you may want every single drop you have got. If you could store the water in *ahars* in the early part of the year, you could guard to a certain extent against the eventuality of having all your water exhausted?—We have only had this experience once in 30 years, and I think, if we begin to let water into the *ahars* again, we would gradually work back to the old system in losing control of our water. These *ahars* are scattered all across the country, and those of one village are connected with those of another. It is a most complicated system. We have accepted this principle now that, if we lose control of our water, we cannot assess.

27. Q. Mr. Toogood seemed hardly to have accepted that principle?—I don't know. In the Eastern Sone it is very sandy soil.

28. Q. (Sir Thomas Higham).—Are you speaking of *ahars* in the middle of a block or outside?—A block may be above the *ahar* or below the *ahar*.

29. Q. There is no objection to their filling *ahars* in the block?—But these *ahars* go into other villages which may not have a lease.

30. Q. What is your objection to charging a fee for filling them? I am not speaking of outside *ahars*, but supposing a man who had an *ahar* in a block came to you and said "I will give you a rupee if you fill this *ahar*." What is the objection to that?—I don't think he would come forward, and besides I say that, once you lose control of your water, you are helpless.

31. Q. You would not lose control of your water in that case. The difficulty I see is what you say that when you irrigate from an *ahar* you cannot say whether the *ahar* was filled by rain water or canal water. But if a man comes to you and says "I have not got much rain water in my *ahar*, put a couple of feet into it, where is the difficulty?—We have tried selling water by volume, but I don't think it has ever come to very much.

32. Q. Before the *hathia* you have a lot of water?—Yes, there is never any lack of water for transplanting the rice.

33. Q. You have a great deal more water than you want before the *hathia*, and you don't seem to be able to do anything with it?—In a favourable year these *ahars* are filled by the rain, and the people won't ask for water outside the lease until the rains fail.

34. Q. But supposing it were a dry year?—How are we going to know when the *hathia* is going to fail.

35. Q. You mean to say the people will not apply?—Yes. They have got these *ahars* and they always contain rain water in the season, and very likely they also contain water from our five years' leases. It is only in a very dry September that they fail and the villagers would never apply to have them filled until it was too late.

36. Q. You don't sell water by volume?—When leases come in late and we don't want to measure, we say "We will keep an outlet open for you for 24 hours at so much," but I think very little has been done in that way.

37. Q. Supposing it were generally known that where there were no leases, if the people liked to apply for water for their *ahars* before the *hathia*, you would be prepared to fill them up at so much a thousand cubic feet, would they apply?—They won't apply before

the *hathia*. That is what led to our long lease system being introduced. We found that these people would wait till the last moment until the middle of October, and then they often got water too late to benefit the crop for which remission of water rate had to be given.

38. Q. Would they pay a definite sum to have their *ahars* filled up?—Filling the *ahars* would only benefit the unleased areas beyond the long lease area, and the villagers would never apply until the *hathia* had failed when no surplus water would be available.

39. Q. Why not let them apply for their *ahars* for five years? Why not have a five-year lease for *ahars* also?—In my opinion this would be a retrograde step in canal administration.

40. Q. You have certain years of drought. They are not very common perhaps, but say they take place once in five years. You propose to reduce the size of your outlets and so raise the duty. Would not the pressure be greater in these exceptional years than you have ever had?—I don't think so. The people are very extravagant in the use of water at present.

41. Q. The more you raise the duty, the more the tension comes on at the times of trial?—I don't think so. They will know they have only got an outlet open for a certain number of days, and they will take good care to irrigate their land within that period. At present the outlet is 10 days opened and five days closed in the *hathia*. We hope to reduce it and make it, say, nine days open and six days closed. That will spare a good deal of water and enable us to irrigate more than we can now.

42. Q. You will ultimately come to your limit?—Yes.

43. Q. You have got a very good duty out of that, 83 acres?—We only got 50 in a year of bad *hathia*.

44. Q. The capacity of canals is dependent upon the amount of water you can get down your canal during the *hathia*?—It is only since we have started to work on the Sone system that we have found out that fact.

45. Q. You said here that the average actually has been 83 acres?—Yes, 80 at the outlet, but all these duties that are based on the four months' discharge are quite misleading.

46. Q. (The President.)—We know that you are interested in the Karamnassa project. I suppose that if you can command the establishment, you will have it surveyed?—Mr. Toogood and Mr. Harris are going up in the middle of next month to see the sites. I have written to find out if any of the agents of the Maharajah of Benares know the country and whether it is open, so that I may have some contours taken to find out what the capacity of the reservoir is likely to be.

47. Q. (Mr. Muir-Mackenzie.)—I see in the month of September that in the Sasaram Sub-division the average rainfall is 7.5 inches. In the year 1892 it went down to 2.42. In a year like that would the people not apply to have their *ahars* filled?—No, I don't think so. In fact, as I say, their *ahars* are gradually being done away with.

48. Q. (The President.)—To go back to the Karamnassa, I have not looked sufficiently at what plans there are. Do you contemplate that it possibly might help the Sone system?—The original idea was to carry on the main western canal through Sasaram up to the Karamnassa and on to Mirzapore. This was stopped, because, as I said in my note, we had not sufficient water in the Sone so the Karamnassa project is now proposed. The Karamnassa is the river on the extreme west of the district. Instead of taking the water from the Sone towards the Karamnassa, water will be brought from the Karamnassa back to the Darogaoti into all that Bhabua tract which we know is very liable to scarcity of rain. In Bhabua, in my note, I have shown that the *hathia* rain failed about 12 times in the last 20 years. If you go lower down into Midnapore, you will find there were only two bad years in 20; in Cuttack there were about two bad years and one doubtful year in 20; whereas, every alternate year in Bhabua has a failure of the rainfall which is required to bring the rice into ear.

49. Q. To go on to Champaran and Saran, this side of the Ganges, I understand that you look on the Saran project as altogether a very doubtful one; I mean these canals from the Gandak?—They have proved most unsatisfactory, and I don't know quite what the reason is. They have been working for 20 years, and I suppose one of the defects of the scheme was that there was no regulator in the *sota*.

50. Q. I gathered from one of the witnesses at Muzaffarpur that at one time, when they wanted the canals opened in a hurry, the channels had silted up, and thus the opening did not occur till six weeks after when it was too late, and they did not care to take the

water. That could not have happened if there had been a regular establishment maintained by the Government or the District Board whose duty it would have been to see to the silt clearances. I don't think one has a right to say that it was a hopeless case, because it has not been very successful hitherto from want of management?—I think it is really worth while to investigate it and draw up some scheme that would bring it more into line with the Sone. You would have to construct a regulator outside the embankment in the first place, but without a survey it is impossible to say what additional works are required.

51. Q. From these rainfall statements I make out that every third year here is a year of drought. For instance, in Gopalgungo, in 20 years, there have been six bad years, 11 good and three doubtful ones, which were pretty near bordering on the bad years?—Yes; and Gopalgungo is pretty central for this Saran District. I think from the evidence and from the rainfall statements it is clear that irrigation for the rice crop is necessary more frequently than the witnesses at Saran made out.

52. Q. I would even go further and say that the fact that the thing existed at all, being left to itself without the controlling hand of an engineer, gives one a fair reason to hope that in better hands it might be a success. What do you think?—I think it is very well worth enquiring into. The Local Government has spent 7 lakhs, and I think we might safely spend a little more money in the hope of making the scheme a success. At the present moment all this money is simply sunk and lying idle.

53. Q. Did Mr. MacCarthy say that gauge-readers were kept up on the Gandak?—I am not quite sure that he is accurate in what he said about gauge observations in the Gandak. It is most essential to have observations taken in all rivers likely to be utilised such as the Kamla and Bagmati. I think the District Boards might spend a little money in this way. It would not cost much to have one or two gauges established on these rivers.

54. Q. What do you think of the Tribeni scheme?—It is going on. Mr. Butler hopes to do very well this year. The tract is unhealthy; it is feverish, and the coolies gave it a bad name last year. I think more perfect arrangements have been made this year for pushing on the work.

55. Q. How are you getting rid of the cross drainage?—In some places the canal is syphoned and in others carried in aqueducts.

56. Q. Have you got funds to carry it on as fast as you wish?—Sir Thomas Higham says we can get any money we like. We have got six lakhs this year, but he says we need not be tied down to six lakhs; we can get ten lakhs if we like.

57. Q. What is the estimate about?—Rs. 37,91,000, including establishment.

58. Q. Do you consider this Tilari project promising one?—I am afraid not. From Mr. Maconochy's report it will be seen he is very decided and expresses himself very strongly against it.

59. Q. Then what do you think of these three projects,—the Tilari, the Bakhiya and Puspa?—I am afraid they would fail just at the time water was required. They are small streams and could be very easily banded up above by the Nepalese.

60. Q. Mr. Maconochy in his report says:—"The Douso scheme may, perhaps, be placed in the same category: for, although there were two *bunds* across the nullah in Nepal, there were also three *bunds* in British territory, showing that there was some water to utilise for irrigation. What do you say?—Yes.

61. Q. What is your opinion as regards the Bagmati?—The floods are the great obstacle here. This canal runs right across the drainage of the country and as it is not possible to construct flood embankments in Nepalese territory the irrigable area could not be protected as is the case in Orissa.

62. Q. Then you reserve your opinion about the Bagmati till more is known about it?—I think the suggestion that Mr. Disney made is worth enquiring into. That does not interfere with the cross drainage in any way.

63. Q. (Sir Thomas Higham.)—That is working on the same lines as Mr. King has been doing?—Yes.

64. Q. You have spent Rs. 52,000 on *pains* and cuts for making these canals?—Yes.

65. Q. (The President.)—Do you think there are any of these rivers we can leave out of consideration at once, or do you think it is an open question with regard to them all whether they can be utilised?—I think these four—the Tilari, the Puspa, the Bakhiya and

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the Dhams might be obliterated, as they would fail just when required.

63. Q. Anyhow you could put them in a second line giving preference to the others?—Yes. As regards the Bagmutty, Mr. Buckley and Colonel Haig have always admitted that a weir is essential across the river and therefore you must get as big an area as you can to irrigate. As far as I have read the old papers no one seems to have dealt with this question of carrying the canal across the whole of the drainage of the country which is itself liable to heavy floods.

67. Q. (Sir Thomas Higham.)—You say there is some scope for work of the same kind as Mr. King has been doing?—Yes.

68. Q. That consists of carrying out works according to the exigencies of the season. They may go, I understand, for two or three years without doing anything with these canals?—Very likely.

69. Q. Then when they know there is a demand likely to come on they set to work and open a channel where it is required and make a bund?—Yes. After the season is over they put a bund across the mouth to keep the silt out in years when the channel is not required.

70. Q. The Public Works Department are aiming at making an arrangement which will involve a heavy capital cost, and then be more or less permanent. But for a work like Mr. King's work, you will require men on the spot able to see at once what is to be done for the season, and who must be able to lay their hands on money at once?—Quite so.

71. Q. I don't know how such a scheme could be worked except by a District Engineer?—That is how it should be done. You could not dream of working it in any other way.

72. Q. I don't see what is to prevent its breaking down as the Saran canals have broken down?—The Saran canals have been working in very much the same way.

The President.—They had not got a Mr. King there?—That is the difference.

73. Q. (Sir Thomas Higham.)—There is this danger, I suppose, that a season may come when you cannot get control over the water?—Yes, and when that time comes, then the question of a permanent regulator will have to be considered. Of course Mr. King was getting water all through September. His scheme has therefore got that great advantage over the Saran canals.

74. Q. You could get water all through September in the Saran canals?—Not to the same extent as he did.

75. Q. There is lots of water in the *sota*. What is to prevent your opening the sluices?—I should think there is a good deal of silt in the *sota* after each freshet. He got supply from the main river.

76. Q. You mean in Saran?—Yes. I don't think they ever opened the sluices until October in the Saran canals. They cannot bund the *sota* until the river falls to a certain level.

77. Q. There is no reason why they should not be—We have come to a deadlock now. The Government is not going to spend any more money on maintenance and the zamindars won't pay the maintenance charges. The canals are only opened now when the civil officer says it is absolutely necessary to save the rice crop.

78. Q. That is how they are never opened until October?—We did sanction the opening of them this year in September, because there was not sufficient water to do the transplanting, but we told them we could not open them in October again unless they paid some money for the cost of clearing the channels, so we are now absolutely at a deadlock.

79. Q. They have paid nothing?—They pay nothing.

80. Q. Are they open now? Has anything been done to shut the water down?

Mr. Hare.—They are open now.

81. Q. You have not got your contribution?

Mr. Hare.—No, they may be closed now. I am not quite sure.

Witness.—I think they are closed. I could not be certain, but I think they must be closed.

82. Q. Has any money been paid for this year or ever?

Mr. Hare.—No.

83. Q. (Sir Thomas Higham.)—The Tilari project is probably hung up, because there is no certainty as to supply?—Yes.

84. Q. How much do you want for that?—50,000 acres is the area commanded; 200 acres of *khari* to the square mile would mean 60,000 acres.

85. Q. How much water is wanted?—300 cubic feet.

86. Q. Would it be possible to get that down in the Tribeni?—We are having a lot of demands on us now for the Tribeni.

87. Q. I suppose you could make it as large as you liked?—We propose to extend the Tribeni. We have raised it up to 2,170 cusecs but we have another demand across the Sikrana. I should like to get across the Sikrana and Tilari.

88. Q. You could not go across the Tilari?—I have no personal knowledge of the district.

89. Q. Is it too late to consider the question of enlarging the size of your syphons, so that, if you want to carry out these doubtful schemes, you will get more water there? Supposing you put five or six thousand acres on to your estimate, the Tilari, Pussa and Bakhiya would mean another 30,000 acres, plus perhaps 30 square miles across the Sikrana?—We would have to provide altogether for another 40,000 acres; that would be about 800 cubic feet.

90. Q. Your syphons are now devised for a full supply of 2,170 cusecs?—Yes.

91. Q. They consist of 6 feet barrels. If you were to make all those barrels 8 feet, you could increase the capacity of the syphons by $\frac{1}{3}$. It is not too late to do that?—No.

92. Q. Do you think it would be worth while doing that?—I don't know if the money is available. It is certainly worth considering.

Sir Thomas Higham.—I don't think there would be any difficulty in getting the money for it.

93. Q. (The President.)—I suppose, if 40,000 cubic feet were wanted, you could have it there. There is no limit?—No, there is no limit; but we might have eventually, I cannot say, to build a regulator.

94. Q. Then you think it worth while to increase the size of the syphons?—I think so. We only provide for 200 acres to the square mile at present. It is said to be a good rice country and only wants to get water to produce 250 or 300 acres to the square mile.

95. Q. (Sir Thomas Higham.)—You have not worked up to that on the Sone?—No. We have only worked up to 138 acres to the square mile there.

96. Q. We have heard that the Saran canals have been known to irrigate 22,000 acres in one very dry year. Can you say how they got hold of the figures?—I don't know. I believe they did try to assess the raysats, but they could not realise anything.

97. Q. How did they try to realise?—I presume they had some sort of measurement. But as regards that 22,000 acres, I don't know how reliable it is.

98. Q. How is one to find out?—I dare say Colonel Hodding could tell us.

99. Q. The Irrigation Department put all these areas in their reports. Where did they get their figures from?—I don't know.

100. Q. It is said that a portion irrigated by the Sone canals is never paid for; that it was outside the blocks; have you got anything to say about that?—A rayat may pass water on his field to outside areas.

101. Q. How did he get the water on his field?—From the village channel.

102. Q. He lets the water go on to other land; that land got a crop and pays nothing?—These people may be equally anxious to get rid of the water before the *hathia*, so it would be a disadvantage then, as it might do harm.

103. Q. Does much irrigation go on in that way that is not paid for?—I don't know.

Mr. Muir-Mackenzie.—Mr. Tongool said there was a substantial amount in the Eastern Sone Division. I have since ascertained. It is about 4,400 acres a year in the circle.

104. Q. (Sir Thomas Higham.)—You don't think that is an important question?—No; we have got our value for the water given.

105. Q. In reference to the works that have been done on the Bagmutty, do you recommend the cut being completed to see what could be done with it?—I think it should be enquired into.

106. Q. The District Engineer could say what he proposes to do with it?—Yes.

107. Q. I understand he wishes to work up in connection with these two rivers?—I don't think there is any field work done. Mr. Disney's proposals are not based on actual surveys; they are simply in the air.

109. Q. Should it be done by the Public Works Department or the District Engineer?—It might be taken up by the District Board.

109. Q. (Mr. Rajaratna Mudaliar.)—With regard to what you said about the block being drained, what is the area of rice under the Sone canals?—320,000 acres are irrigated.

110. Q. If all that water is to be drained, it would be capable of irrigating an appreciably large area outside the blocks?—Yes, the people don't want water when they let it go; they always want to dry their fields 15 days before the *kathia* begins.

111. Q. Does this water benefit the crops outside the block?—It does not; everybody wants to get rid of the water at the same time.

112. Q. The area outside the blocks are not likely to have over much irrigation; are they?

113. Q. (The President.)—Our experience on the Nile was that the water used in rice irrigation always washed a certain amount of salt from the soil and did harm if we attempted to irrigate twice with the same water?—I have had no experience of that.

114. Q. If you constructed drains to carry of water, would the people outside the block areas be induced to apply for water?—I consider the acres irrigated outside blocks unimportant.

115. Q. (Mr. Muir-Mackenzie.)—Mr. Toogood said that the amount of land that obtained water in this way was in one part of the Sone so great that it checked irrigation?—The eastern side is very backward and the soil is very sandy and uses more water; there is not the same hold over the water; whether it is due to the individual officer I am not prepared to say; it is 12 years since I left the Sone.

116. Q. (Mr. Rajaratna Mudaliar.)—If water is stolen have you no power to charge water-rates?—If it was due to carelessness on the part of the canal staff, I should punish them.

117. Q. You have a separate measuring staff and a separate staff for collecting; do you see any objection to the Deputy Collectors checking the measurements of the separate staff?—I don't think they could for want of training.

118. Q. Could not Deputy Collectors and Sub-Deputy Collectors be trained to check measurements?—With what object?

119. Q. For the sake of efficiency?—There is sufficient efficiency now. All our collections are got in in time.

120. Q. It is a question whether the whole of the amount is got in?—Our men are better able to do it, though they may not check each individual field they know the area of the block.

121. Q. Is your block properly demarcated?—Yes.

122. Q. (Mr. Allen.)—You said that the cost of keeping up navigation on Sone was considerable. Would

you recommend the abandonment of navigation on the Sone?—Not at present when the lock gates require to be renewed it may be considered. We are reducing the number of men all round, but we must keep up the lock gates as they are. I probably exaggerated in saying that it costs a great deal. It does not cost as much as I at first imagined.

123. Q. You would not drop it altogether?—I certainly should not.

124. Q. We have had some evidence about the small area of *rabi* irrigated from the Sone canals; don't you think, as a matter of fact, the *rabi* has been extinguished by the extension of *aghani*?—That is true to a great extent in the long lease areas, but if there is a bad *kathia* on all the western side of Shahabad, we get a large *rabi* area.

125. Q. The tendency of regular irrigation must be to cut down the *rabi*?—Yes, at first it was 30 per cent. in every 5-years lease, now it is much less.

126. Q. With regard to what you said about the Karamnassa, do you propose to inspect the Durgaoti scheme also?—Yes; I don't think I shall be able to contour the reservoir site this season.

127. Q. Why?—For want of staff. I mean to try and get it done. I am not certain what staff will be required for the Karamnassa.

128. Q. We have heard of the prospect of investigating certain small schemes in the Terai similar to Mr. King's; have you a staff of engineers to do that work?—I am afraid not, but the District Engineers have got a good deal of local knowledge. I should require a survey staff as well.

129. Q. Have you the material to organize a survey staff? You have the Karamnassa, Durgaoti and other schemes along the Himalayas?—No. I think the District Engineers could give a good deal of assistance there.

130. Q. I think the answer is, you have not sufficient men?—Not to take them all up at one time.

131. Q. What class of men would you require, as regards these minor schemes?—Temporary surveyors, once having settled the lines on which we are going to work; it would not take long to survey and level these lines; the question is who is going to provide funds for the investigation. I have since decided to give money from Imperial and Provincial Funds.

132. Q. Mr. King spoke about detailed examination and personal trouble taken. It does not appear that the survey could be done quickly?—I think he refers to the distribution of water.

133. Q. (The President.)—Have your canal officers on the Sone canals got magisterial powers under the Canals Act?—Yes.

134. Q. Do they exercise these powers?—To a very limited extent.

135. Q. There are certain penalties for breach of certain sections of the Canals Act?—Yes.

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WITNESS NO. 51.—MR. L. HARE, Commissioner, Patna Division.

Note on Irrigation Works.

1. I have nothing to add to the particular information supplied by the District Officers in their replies to the questions of the Commission.

2. I would wish to bring to notice the desirability of legislation to give power to the Collector to interfere in case of the construction of *bunds* in rivers—

- (a) In order to prevent disputes and rioting.
- (b) To prevent unreasonable waste of water to the detriment of those who live lower down the river.
- (c) To prevent grave and material alterations in and diversions of the rivers which may seriously affect the country.

3. I would recommend definite recognition and acceptance for the principle that, in the case of schemes in which the demand for water is intermittent, and consequently the receipts from the sale of water are irregular and uncertain, a cess should be levied on the lands protected by the scheme—

- (a) The benefits are so great as to secure ample return to the cess-payers.

(b) The payment is in the nature of an insurance against failure of crops and famine which should be borne by the area protected.

4. It would be necessary to legislate. The amount of cess so leviable would be limited by the Act. It should be paid for five years at a time, and so calculated that, with the receipts from the sale of water, it should cover working expenses and a reasonable interest on the capital expenditure.

5. I would levy the cess direct from the occupiers along with the demands for water supplied in the same manner as the present canal dues are levied.

6. This proposal would apply to schemes prepared by Government. I would at the same time provide, for the case in which application was made for irrigation works on lines corresponding to those of the Bengal Drainage Act, i.e. suitable schemes approved by Government would be carried out in a tract where the majority of the persons interested accepted the scheme.

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1. Q. (The President.)—Mr. Maddox in his paper says:—“I notice that the total cost of famines since 1873-74 has been Rs. 76,18,274, excluding the amount spent by the Maharaja in 1876-76.” That is in the one district of Durbhanga?—Yes.

2. Q. Has there been fairly good value obtained for that?—No, except as regards saving of life.

3. Q. Would it be a fair test of the intensity of famine in the different districts to compare the amount spent on relief works?—It will be much fairer in future, as there

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will be a Commissioner appointed under the Code to ensure a uniform system.

4. Q. Are your programmes of relief works complete?—I think we should have more schemes which give a promise of being really useful, worked out in detail and kept ready. In the past famines we have been, I think, too apt to select works which were convenient and not those of real value.

5. Q. (Mr. Muir-Mackenzie.)—That was, I suppose, largely owing to want of time?—Yes, to some extent, and also to the idiosyncrasy of the officer dealing with the subject.

6. Q. (The President.)—The tendency has been more and more to give relief in much larger proportions?—It is much more difficult now to resist applications for relief.

7. Q. There was more relief in 1896 than in 1876?—No, I think it is the other way.

8. Q. Are you satisfied with the system on the Sone Canals with the amount of revenue authority possessed by the canal engineers?—I think the system is working very well.

9. Q. Are the relations of the district and canal officers quite satisfactory?—Yes, quite. When the Lieutenant-Governor went down the year before last there were crowds at every lock, but there were no complaints, merely petitions to get water a little cheaper.

10. Q. There were no complaints of injustice or hardship?—No.

11. Q. You have no doubt of the importance of providing the Bhabua Sub-division with a supply of water?—None whatever.

12. Q. I think your opinion is that in the Saran Canals a cess would be acceptable?—I think so if you can show that you are giving them value. Whether accepted or not, I think it should be levied if you can give them value. In that case we would have to meet an outcry, a paper outcry, not from the people concerned; there would be strong objection in the Legislative Council.

13. Q. An argument used would be that all had to pay, although all did not benefit equally?—Yes, that would be one line. I should levy it locally if the scheme gave only local benefit.

14. Q. In those cases, where irrigation would only be taken at intervals of a few years, do you think that would be a preferable way of raising Government revenue to a water-rate on the area?—If you had proper control over the water and a definite scheme, I would prefer a water-rate on the area, levying so much on the water taken; but if not, I would prefer a cess on the whole district—every man would benefit. It must be a small cess of course.

15. Q. What should the maximum be?—Half an anna on the rupee to begin with.

16. Q. (Mr. Muir-Mackenzie.)—With regard to the severity of the famine, I see an enormous difference in these figures that are given here as regards the numbers on relief in 1873-74 and 1896-97. For instance, in Durbhanga, the numbers on relief in 1873-74 was 55 million and in 1896-97 the figure was 22½ million. Was the famine of 1896-97 as severe as that of 1873-74?—I could not say. Planters who were present at both say they were of equal severity.

17. Q. As regards failure of crops?—The failure of crops was more severe in 1896-97.

18. Q. Has the opening up of the country by railways and greater facilities of communication made any great difference?—I think it has made a great deal of difference in the resisting power of the people.

19. Q. Can we take it that you are not likely to have a more severe famine than you had in 1896-97?—I think it is possible you could have a more severe famine if you had had three successive bad years.

20. Q. Have three bad years in succession ever been known in the district?—I don't think so.

21. Q. (The President.)—I suppose prices never rose in 1896-97 to the 1873-74 prices?—No. The increase was not so great. The average prices are now so much higher.

22. Q. (Mr. Muir-Mackenzie.)—In the famine programme paper we are given proportions of the population for whom work is provided for each district. Are you satisfied that their proportions are properly adjusted to the requirements of each district? I find that in Muzaffarpur work was provided for 80,412 persons, and the average number employed in the famine of 1896-97 was 31,424?—I think the number provided for might have been lessened there.

23. Q. In Durbhanga also the number provided for is 176,330, whereas the number employed only works out to 83,461. Again in Champaran provision is made for 177,229 persons and the average number in the famine was 63,635?—The work is for the whole district and relief may be wanted in only one or two places. I think a great many of the works would be worked out eventually. The idea is to leave a large margin.

24. Q. I suppose the ideal to aim at is to have no work that is not useful?—Yes. I would even go to the extent of taking men away a considerable distance for good works. I would sacrifice more to the importance of the work.

25. Q. You don't think it is impracticable to convey people about in this way?—No; in this district you could take the cream of the labour away. The real labouring class are the first to come on relief; these men are accustomed to travel about. That would leave small works to be carried out by inferior labour.

26. Q. Would you say that it is preferable to have large and extensive works and run the risk of people being on them who did not require relief?—I would simply bring the people together, presuming that the work was necessary.

27. Q. I understand you to wish to take advantage of your good time to prepare a complete survey of useful works?—Yes, for such works as the Collector is not an expert upon; he knows roads, but not canals.

28. Q. You want, if necessary, to have the aid of professional skill through the Public Works Department for the purpose?—Yes, not only for relief purposes, but because I would like to take a few up in advance.

29. Q. Would you like to see the Saran Canal works undertaken by the District Board?—I do not care who has the control, so long as the local officer has full control and is not required to refer to Calcutta at critical times. If there is to be a cess, whatever the proceeds they should be handed over to the District Board.

Mr. Allen explained that the law was an obstacle in such a case.

(Witness.)—Where we have got to legislate for collecting the cess, we might as well by executive order prevent the District Board spending its present cess on irrigation.

30. Q. (Mr. Muir-Mackenzie.)—Some of the planters mentioned that the District Board had to spend periodically large sums on relief works; has that actually been the case?—No, but Government has power to insist on every penny going to relief works. Sir Charles Elliott insisted on it in 1892, but Sir Alexander Mackenzie let them off.

31. Q. I understand the Board starts a work when famine is expected; have any substantial sums been spent in that way?—In Muzaffarpur we spent something more than a lakh. I cannot remember the exact amount.

32. Q. The District Boards seem to be liable in years of moderate scarcity to be called upon to provide work which it might not want simply on the chance of people wanting relief?—Yes.

33. Q. Is there any way of getting at the actual sums spent?—I think I can get them for you.

34. Q. Has the Local Board always to set apart a sum on account of this danger?—No, not unless the warning note is given.

35. Q. In Shahabad I think you said there is no doubt of the necessity for irrigation. Is there any doubt that water will be taken?—In that I must trust the local men. I think it will be taken. I did not go into the question, as I was told that no reservoir was possible.

36. Q. Do you think they would pay the Sone Canal rates?—Yes.

37. Q. At once?—Yes, I think so; they would not take a great quantity of water at first.

38. Q. I observe from the famine map that nowhere through the sub-division was relief extended to more than six per cent. of the population; is that not a sign that distress is never very intense?—They always live poorly. Every year they go away to get their living, not only in famine years.

39. Q. If the Karmnasa scheme is impossible, is there any chance of saving the country by the extension of small works?—Yes, there are other schemes which might be gone into like the Durgauti. Something could be done also with pains and cuts into low lands.

40. Q. For the Gya District I understand there is no large work?—No; if there is a proper survey, I have no doubt a good deal of work could be found.

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41. Q. Some of the *pains* appear to be large works; would it be worth while to have the country surveyed and put under Government management?—The question of Government's interference must come up if the estates are subdivided more and more.

42. Q. Do you support Mr. Oldham in his proposals on that point?—Yes.

43. Q. Do you support his proposal that the Collector should have the power to compel zamindars to carry out repairs?—Yes.

44. Q. For small *ahars* as well as small *bunds*?—I should not use it if I was Collector unless the Executive Engineer said it was necessary.

45. Q. Would you give him an inspecting officer?—Yes, I think that is necessary, because a Collector with the best intentions might do harm in pushing schemes which he thought good, but which really were not good.

46. Q. Would you like him in the case of *pains* to act in anticipation of complaint?—He would act on the complaint of the Inspecting Officer.

47. Q. I mean complaint on the part of the people?—I don't think that would ever happen.

48. Q. If the Collector is given this power, would he have to proceed often to extremes?—No, not often, but to give him the power which would serve a useful purpose.

49. Q. Do you think in a district like Gya, with a lot of complicated rights in water, it would be possible to have a record-of-rights?—I would have a record of the facts.

50. Q. You would not determine the rights?—No, I would allow the Collector to give an *ad interim* order; he might state the case and then it should go before the Civil Courts. There are some disputes he could not decide.

51. Q. Would it not be advisable for the proper husbanding of the water that the Collector should lay down how the stream should be divided?—I should not allow him to do more than pass temporary orders. He can determine all the facts but not the effects of the facts. I would not allow him to make a record-of-rights.

52. Q. Patna, I understand, we may consider to be immune from famine?—I do not think we can say that everything possible has been done. If the Collector were assisted by expert advice, he could get a great deal done by the people themselves.

53. Q. To recur to the question of a record-of-rights, in cases where a right of water has been made out and the existence of such a right obstructs the administration of the stream to the best advantage of the public in general, would you advocate that Government should have power to acquire the rights in that water, just as it can now acquire rights in land?—Yes, where a man had already a vested right, Government might acquire a right to the balance over and above what the man could fairly appropriate.

54. Q. If a man were obstructive, why should not his rights be taken away altogether?—That would be very expensive.

55. Q. Not necessarily more expensive than rights in land. You would give the man compensation for the appropriation and the value of the rights?—I would reserve to him all you possibly could consistently with using the stream to the best advantage.

56. Q. Regarding the repairs of *pains* and *ahars* and other small irrigation works, is it generally the duty of the zamindar to repair?—That is the theory no doubt.

57. Q. Has it been accepted by the Courts?—I cannot say; I do not know of any case where the rayats have sought to get it enforced.

58. Q. Would the zamindars generally accept it if it came to putting it down in the record-of-rights?—Some would and some would not.

59. Q. Would it be safe generally to record it as the duty of zamindar?—Yes, though they have shirked it a great deal.

60. Q. Are there any duties on the part of the rayats in customary labour?—Yes.

61. Q. In Gya we heard of the *golan*, a levy of labour in cases of emergency. Is that the limit?—As far as I know, it is. I do not know the Gya District very much.

62. Q. Is that confined to the Gya District?—There is, I think, something of the kind in Patna.

63. Q. In Bihar in the famine I notice that the average number on relief for 1890-97 was only 14,000. That looks as if the famine must have been slight?—Yes. They helped themselves to a great extent by emigrating and sending back their money.

64. Q. Are there plenty of outlets for that emigration?—The men went out in large numbers, but did not all succeed in getting work.

65. Q. Have you been able to form any opinion as to the chance of getting anything like a hundred thousand acres under the Saran Canal?—No.

66. Q. Is there any reason to suppose that, before the embankment was made and when the channels were allowed to do their duty unimpeded, there was anything like that area under irrigation?—The cultivation must have been very different in those days. There must have been constant floods.

67. Q. There are no remains of any works of *ahars* or *pains*?—No.

68. Q. (The President).—They were devastating floods, I suppose?—I understand so.

69. Q. (Mr. Muir-Mackenzie).—Is there any reason to suppose that these embankments have really cut off a very large amount of irrigation?—It has altered the nature of the country. There are no floods now.

70. Q. Were the floods useful?—Of course they strengthened the ground, but the people often lost their crops.

71. Q. Did they bring down silt?—Yes.

72. Q. In other parts of the country sometimes the flooded land is the only land where there is crop in time of famine. There is a considerable amount of well irrigation in parts of Saran?—Yes.

73. Q. Is there any chance of a material extension?—I should think so, very considerable.

74. Q. What measures would you propose?—I would encourage rayats to take advances. A good many zamindars are rayats themselves with small holdings.

75. Q. To go to Champaran, when the Tribeni Canal is being made; will that fully protect the district?—It will make an enormous difference, but there was very large relief given outside the Tribeni area.

76. Q. There will no doubt be a movement into the Tribeni tract during a famine?—Certainly I find that the effect of a canal extends to a considerable distance beyond the area actually covered by the canal. It means a great deal that within the canal tract all charity is not cut off.

77. Q. If you cannot say confidently that it will be a complete protection, it will be a very large measure of protection?—Yes.

78. Q. Do you feel confident that the people in Champaran will take the Tribeni water in an ordinary year?—I do not think there is enough cultivation to take it all at present, but the cultivation will extend. The question is—when it does extend will the health of the district improve? At present the Saran men, although they are so crowded, are very unwilling to go up there. There must be a great deal of immigration from somewhere before the whole area can be taken up.

79. Q. There are considerable areas of waste and the country is unhealthy?—Yes.

80. Q. Is water wanted very often there?—They cannot cultivate the whole of their holdings without it even in ordinary years.

81. Q. Does Champaran differ very much from Muzaffarpur and Durbhanga in that respect as regards rainfall and the necessity of water?—Yes, but not very much. If it was cultivated, it would be much the same.

82. Q. We understand that in Muzaffarpur and Durbhanga the water is not wanted more than once in four years?—They would want it more in Champaran. Northern Muzaffarpur and Northern Durbhanga do not depend entirely on the rainfall. They get an enormous amount from floods and the overspill of the rivers. We have not had famine or scarcity there when, according to the rainfall, we ought to have had one or the other.

83. Q. You would say that Champaran is more liable to scarcity than Durbhanga and Northern Muzaffarpur?—It is less protected by spill water, but the population is so small that they generally get enough to live on.

84. Q. According to the map there is quite as much distressed area in Durbhanga as in Champaran. There is hardly any dark-red area in Champaran?—It depends on the percentage of population relieved.

85. Q. What I want is to get at the grounds for the belief that water will be taken there and not taken lower down?—They are not provided for at present in Champaran; the rainfall is not sufficient there, and is fairly sufficient in

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the other two districts. I do not think the spill water in Champaran counts as much for the district as in the north of Muzaffarpur and Durbhanga.

86. Q. The large schemes for Muzaffarpur are not then very promising?—No.

87. Q. Would it not be advisable to ask that the feasibility of taking the Tribeni even further should be considered?—You cannot cross the Bagmati with the Tribeni Canal.

88. Q. (Sir Thomas Higham.)—It would be an unnecessary expense. If you go into the Bagmati, you will have to put up a weir; and if you make a weir, you can get enough water from the Bagmati itself. We must draw a line somewhere. I think it would be well to go up to the Bagmati. It looks as if the area to be protected by irrigation in Muzaffarpur is small?—By any big scheme, yes.

89. Q. Do you think small schemes could cover a considerable percentage of the area?—What I should like to know is whether the water can be brought into the *chaurs* earlier in the year in anticipation of a possible failure of the rains. Take the Baya river. The spills from the Gandak river filled all the *chaurs* and these gave off their supply to the Baya all through the year. The planters agreed it would be good to close the old breach and put a sluice in, and now they are of opinion that they have made a mistake; their money has not only been lost, but mischievously spent. Let these schemes be looked into and see if we cannot do something to secure water being brought in earlier in the year in case there may be a failure in that year.

90. Q. (Mr. Muir-Mackenzie.)—And something similar might be done in Durbhanga?—A good deal in the east sub-division especially.

91. Q. All these schemes seem to me to protect areas outside the east sub-division of Durbhanga in which there was most distress?—There is an enormous area of *chaurs* east sub-division that was very dry.

92. Q. You hope that might be helped by some such scheme as you suggest?—Yes, by letting the water in the *chaurs* earlier in the year when the rivers are high.

93. Q. If water was put into the *chaurs* earlier in the year and you had heavy rain afterwards, would the country be seriously damaged?—Not seriously, but there would be some injury. I do not look upon floods as a very serious injury on the whole. They are not very violent.

94. Q. Do you know the works which Mr. King constructed for the Maharaja in Durbhanga?—Not very well.

95. Q. You agree in the general opinion as to their great usefulness and efficiency?—I accept that.

96. Q. Is there any chance of the material extension of well irrigation in these three districts of Champaran, Muzaffarpur and Durbhanga?—It is difficult to say.

97. Q. Why is it not more extended than it is at present?—The poverty of the rayat and his unwillingness to incur a risk.

98. Q. There is no unsuitability of soil?—Not generally. It is not much good a man having a well if he has no labour to work it.

99. Q. You do not think there is room for covering the country with as many wells as the best part of Saran has?—No. The soil is more suitable in Saran and there is more labour there.

100. Q. Investigation is wanted?—Yes, distinctly.

101. Q. It would be a mistake to abandon hope of extended well irrigation without going more into the subject?—Yes.

102. Q. As to advances for land improvement, you actually gave bounties for *kachcha* wells during this famine?—Yes, about a rupee a well; they cost about two rupees. They covered a good area in Sitamarhi, but not much elsewhere.

103. Q. Would you give bounties for the construction of *pakka* wells in ordinary times? That has been seriously put before us?—I would if it were proved that they would be very useful in a particular part.

104. Q. The Opium Department apparently advance money without interest. Would you go so far as that?—I would not mind going so far as that if the survey showed that it was desirable as a good field for extension.

105. Q. Are you satisfied with the present system for the distribution of advances?—The Collector could do a good deal more if he knew his ground; if he were satisfied that it would be a good thing to make a well in a particular place, I should always be cautious of pushing an improvement unless I was sure it would be a good investment for the man himself.

106. Q. But supposing the Collector wished to push advances, could he not do it more effectively with a change in the system?—I think the present system serves well enough. There is no doubt a little obstruction, but it is very easily got over. The rayat won't take Land Improvement money; he will Agricultural Loans money. If he is going to give Rs. 200 for a well, he must be a substantial man; that is, practically a zamindar.

107. Q. Would he not take advance for improvements if the loan were spread over a longer period?—That would mean continual responsibility, but it would be a help certainly. It is not so much the system that is at fault; it is the number of small men.

108. Q. In Bombay and in Madras not only the Sub-divisional Officers but the Tahsildars are empowered to grant advances?—I think they might be given power to make enquiries, but they should get the order of the Collector before making payment.

109. Q. Is it necessary to have the Collector's sanction?—You would lose a lot of money if you did not.

110. Q. In Bombay we have not lost the money. I do not say that it has not been used for other purposes. As a general rule, it is recovered without any sort of difficulty?—In the famine we gave a remission of one-third for land improvement works, and there was very little taken—under half a lakh.

111. Q. Very much larger remissions were made in Bombay Presidency. There and in Madras remission of a half was promised in many cases. Could not the power go lower?—to the Sub-Deputy Collector?—He is generally in charge of the treasury. We have only two men in the sub-division—the Sub-divisional Officer and the Sub-Deputy Collector. We could put on a *kannungo*. We used to accept his report in the famine and he gave the money out at once. But the real difficulty is the want of substantial men willing to incur the responsibility of taking an advance.

112. Q. The Opium Department succeeded in getting rid of a certain amount of advances for wells?—Not a very large amount.

113. Q. Still it is larger than has been done outside the department; is it not?—Yes.

114. Q. The Opium Department have adopted the principle of getting the poor people to combine. Could not you do the same?—It would be possible, but very difficult. In the case of the opium advances they are probably all taken by opium men and it is taken eventually out of the opium payments; and the man at the head of a gang has a good deal of control over it. They are all practically combined in the opium business.

115. Q. In the southern part of the Bombay Presidency all these things were said, but there happened to come a Collector who took up the subject very much in earnest, and the advances immediately increased enormously; and in Coimbatore, Madras, the same thing happened; it is difficult not to hope that something more may be done by individual initiative. We got up from a few thousands a year to over a lakh?—Yes, I think a lakh could soon be got rid of here.

116. Q. (Mr. Rajaratna Mudaliar.)—Does the fear of enhancement of assessment by the zamindar deter them?—No. Besides the man who took it here would be nearly always more or less a zamindar. I do not think the tenant would be afraid of enhancement where there is a record-of-rights.

117. Q. Where there is no record the fear does exist, I suppose?—I think so.

118. Q. In preparing your famine relief programme were you not guided by the circular of the Government of India, saying that you should provide for relief for 20 per cent. of the population for three months?—In preparing our famine programme we put down every work we knew of that could be of any use, and if it came to a bigger list than was actually required, so much the better.

119. Q. In 1896-97 over 362 lakhs were spent in Durbhanga District on famine relief. Could you kindly tell us what portion of it was spent on irrigation works?—I could not; but I should say extremely little—next to nothing.

120. Q. Is the condition of the *pains* generally so bad as to call for legislation to enforce upon the zamindar the duty of maintaining them in proper order?—Not generally. It is not so much that. It is the breaking up of the estate. It is more and more difficult to get them all to agree. One man stands out and blocks the improvement.

121. Q. So legislation is now more necessary than it was formerly?—It is growing more necessary, but not urgently necessary.

122. Q. (Mr. Muir-Mackenzie).—Mr. Oldham seemed to consider it urgently necessary in Gya?—I agree as to its desirability, but I do not think that the question is so pressing as Mr. Oldham says. Mr. Oldham, however, knows more than I do about that district.

123. Q. (Mr. Rajaratna Mudaliar).—Does the zamindar levy contribution from the tenants towards the maintenance of these *pains* or *akars* in Darbhanga?—No.

124. Q. Where a *pain* is constructed by a zamindar at his cost, if the cost of maintenance is thrown on him, would you not let him levy a cess to cover the maintenance charges?—I do not think it necessary.

125. Q. Do you think that the introduction of differential water-rates would be useful; that is, with reference to the facilities for water-supply and the suitability of the soil for irrigation?—Some lands in the lower reaches would not get the full benefit of irrigation, and uniform rate of cess will fall more heavily in one place than another?—It is theoretically sound enough, but it depends on the nature of the scheme.

126. Q. Will you not be able to realize a higher revenue if you adopt a system of differential rates?—No doubt, if you press for it in places where the water is very much wanted. I do not see why you should not charge as much as they will pay.

127. Q. In Madras and Bombay we have consolidated assessments ranging from three to twelve rupees. There we differentiate between the quantity supplied and the quality of the soil. Under a system of uniform water-rate that is not possible?—Where you have a consolidated assessment, it is quite sound to make differences. But if you are simply charging for water supplied, you must charge the same price.

128. Q. Say a canal is 10 miles long. Why should not you have a higher rate at the upper 5 miles and a lower rate at the lower 5 miles to get a larger revenue and make the incidence fair?—In the Sone Canal system you might charge more in certain areas where it might be borne, but I do not think there is any necessity for it.

129. Q. (Mr. Muir-Mackenzie).—The rate for the Sone Canal could, without any impropriety, be raised?—I think you ought to recover your expenditure, and if it be necessary, to raise the rate to do so. It would be fair to raise it, but I should like to see it kept as low as possible. I do not think you should charge all you can get. I should raise the rate very gradually up to the real value of the water.

130. Q. (Mr. Rajaratna Mudaliar).—Do you think that any economy could be effected by entrusting the work of measuring and assessing and collecting to one and the same staff?—I have not had enough detailed experience to say.

131. Q. Do you see any serious objection to such an arrangement. The cost of the collecting staff comes to 6 annas per acre?—I don't think you could make any large reduction.

132. Q. (Mr. Allen).—Your records-of-rights-of-water would include the record of any rights that might exist as to using the *pain* on particular days?—That would be one thing; and the length of time a *band* is allowed to stand should also be recorded.

133. Q. If a water-cess were imposed in the Saran District, would you exclude any lands which would not in ordinary years be benefited or those which would never be benefited by irrigation through those canals?—It would depend on the scheme. If any very large area was not benefited, I should exclude it.

134. Q. In this district, where there are schemes for irrigating a strip on the north side, do you think anything like a water cess can be imposed?—I would put it on the local area, something like the Drainage Act cess, except that I would leave out the provision in that Act under which you must get a majority of the people to agree. Let the Government lay it down; we shall get nothing done if payment is entirely optional. We are justified in compelling a tract of country to protect itself.

135. Q. You would have a compulsory levy instead of an optional charge?—Yes.

136. Q. In preference to a water-rate?—Yes. The expense of such a scheme would be small compared with the expense of a scheme where you have a water-rate.

137. Q. Would your proposed water-rate for water actually used as well as a cess?—I would make three stages—one where the scheme affected the whole district, one where it was carried over a very limited area, and one where it was in the nature of a complete system like the Sone Canal

system. In the second case I would charge a small cess every year on the ground covered and also for the water. The water-rate would be the main thing, and I would hope gradually to drop the cess.

138. Q. With regard to Mr. Oldham's proposals for special legislation for disputes about water, would that be something supplementary to the Criminal Procedure Code?—Yes; whether there be a breach of the peace imminent or not, he should have power to decide in cases of disputes or to take fiduciary possession of the works and to administer and maintain them.

139. Q. Would it not be difficult to word a law of that kind?—It would be difficult. It is in accordance with what I proposed for Eastern Bengal. The zamindars entirely accepted the principle of that proposal. We have enormous *churs* there which they are always fighting over; they asked that the Collector should take possession of any disputed *chur* and, if necessary, manage it until he had decided who was entitled to it. A *chur* is an island thrown up in the river and new alluvial accretions.

140. Q. With regard to the two Loans Acts, the Board's rules for the Land Improvements Loans Act do not authorise the Collector to delegate his power for distribution of loans to a Sub-divisional Officer. Do you think that such a rule would be useful?—I do not think that there would be very much use in it. To us Rs. 200 is a large sum. At the same time there is no harm in the case going to the Collector for approval; the delay is not so great as to be serious.

141. Q. With regard to the Agricultural Loans Act, the preamble to the rules discourages the grant of loans under that Act except to very needy cultivators. Is that a useful preamble? Is that the right spirit in which the loans should be given?—I am afraid it is not. These loans are not of much use except in actual scarcity.

142. Q. (Mr. Muir-Mackenzie).—Would you think it advisable to begin with a cess within the Tribeni area?—No, it is not necessary.

143. Q. (Sir Thomas Higham).—About your proposed cess I understand you propose that, in any district in which the demand is very irregular and where water is only required, perhaps once in four or five years, a cess shall be charged on all the area protected in addition to whatever charge may be made in the form of a water-rate?—Yes. If you have a complete canal system in which you can determine to what place the water can go.

144. Q. That cess would be leviable only on that particular tract that can be entered by the canal?—Yes.

145. Q. You say you would levy direct from occupiers along with the demands for water supplied in the same manner in which the present canal dues are levied. If it is a year in which they take water, you would levy the water-rate?—No, I would charge them for the water supplied, and they would pay their cess too. It would be fixed on a five years' calculation.

146. Q. The water-rate would be paid by the occupier?—Yes.

147. Q. He would pay his water-rate if he took water, and a certain charge on the area protected?—Yes.

148. Q. (Mr. Muir-Mackenzie).—Would he also pay the cess?—I would call it an insurance fee.

149. Q. Do you wish both to be paid by the occupier?—Yes. In the case of a complete canal system.

150. Q. I understood the cess was to be paid by the zamindar?—Where you have a general cess, as I would in the Saran District, you will have to take it from the zamindar.

151. Q. (Mr. Allen).—In the case of a complete canal system would you collect your cess from every rayat?—Yes, on the basis of the canal papers—simply a compulsory permanent lease.

152. Q. (Sir Thomas Higham).—The cess to be so regulated as to give reasonable interest to cover the cost of maintenance. You would not call 4 per cent. unreasonable interest?—I should like you to put it lower probably, but I should like to be told the scheme and the probable benefit.

153. Q. Even when that demand is assured as on the Sone, there is very little prospect of touching 4 per cent. I do not see how we can get it on a system where the demand is very irregular. But "reasonable" might be anything you like?—In Saran it was proposed to put a cess on the whole district like the present road cess and to have no water-rates at all and no charges for water. The general opinion is that it would be accepted.

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154. Q. Would it be possible to put on a cess like that as part of the embankment cess?—You would have to amend the Embankment Act. You must legislate, because we have just made a twenty years' agreement for this embankment.

155. Q. The embankment cess is payable by the zamindars only?—Yes, a percentage on the land revenue. The road cess is a percentage on the rent receipts of the estate.

156. Q. If you made these canals and put on an irrigation cess, would that be chargeable on the revenue or on the rental?—On the rental.

157. Q. That is to say, half would be recoverable from the landlord and half from the cultivator. For that you would require a special Act?—Yes.

158. Q. That would involve control by the District Board?—Not necessarily. You can put the control under anybody you like; but I think that the Board might take it up. In any case the man on the spot must have ample power and not have to refer to anybody. The District Engineer has great local knowledge and covers the ground.

159. Q. (The President.)—We should be glad to know if you have any suggestions you can give us?—I should strongly urge that Government should supply us a man to each district, but principally in the northern districts, to make a first or preliminary examination into all possible schemes that may be put forward and to prepare detailed estimates for promising schemes. We could then say that such and such schemes are so beneficial that we should be justified in legislating to secure the money to enable them to be carried out. I do not in the least expect that Government should incur all the cost, but I think it must give help.

160. Q. (Mr. Muir-Mackenzie.)—Who would decide as to the value of the schemes, the Collector or the Government?—The professional expert of the Government. In many cases, where it would not be justifiable to levy a cess, the schemes might be held over to be taken up in a famine. In Bhabus there are many works of that sort that could be done, opening cuts into *chauras* from the rivers to secure the water when floods come, etc.

SEVENTH DAY.

Purulia, 3rd November 1902.

WITNESS NO. 52.—MR. F. T. LYALL, Deputy Commissioner, Palamau.

Mr. 1. Q. (The President.)—You are Deputy Commissioner
F. T. Lyall. of Palamau, I understand?—Yes.

2. Q. How long have you been there?—I went there on the 11th of December and have lately been on three months' leave.

3. Q. Had you before been in Chota Nagpur?—No.

4. Q. You have been about the district and know it well?—Yes, a good deal. I have spent about five or six months on tour.

5. Q. I believe the population is comparatively small?—Yes, and very scattered; 120 to the square mile.

6. Q. You say in answer to question No. 4 "the rainfall is so precarious in this district that almost all the winter rice crops are dependent on artificial irrigation, the *bhadai* rice crops being excepted. The normal area of the winter rice crop in this district is 277,900 acres. Twenty-five per cent. of the *rabi* crops of the district requires artificial irrigation"?—These replies were submitted before I returned from leave; they are not absolutely correct.

7. Q. You say in answer to question No. 1 that the average gross area annually cropped is 733,600 acres, and you go on to say in question No. 4 that "the normal area under *rabi* food crops is 181,600 acres." *Rabi* is a large proportion?—Yes, 25 per cent. is *rabi*.

8. Q. (Sir Thomas Higham.)—The crop that requires irrigation chiefly is the rice?—The irrigation required for *rabi* is chiefly for the germination of grain and wheat. I think irrigation for *rabi* is of less importance than irrigation for rice; when the rice crop has failed they are inclined to put down *rabi*.

9. Q. (The President.)—Do they get a better return out of this rice?—Yes, very much; an average crop in rice would yield 75 per cent. more than a *rabi* crop.

10. Q. And it would be got with less trouble?—Yes, I think 75 per cent. of the *rabi* is not open to irrigation and most of the rice is irrigated.

11. Q. In answer to question No. 5-A you say "since 1896-97 the level of prices in the grain market has remained very near the condition amounting to scarcity." That is for the last five years?—Yes.

12. Q. Have the people at the present moment just got their heads above water?—They were extremely badly off last year. Government spent a quarter of a lakh on embankments and repairs of *ahars*; several zamindars have spent a good deal also. I have not required relief works, as there are sufficient jungle products, such as *mahua*, so that the people are not so dependent on cereals as they are elsewhere.

13. Q. Last year you had good rain?—Yes, but it was extremely late; there was an opportune fall of rain on the 20th of September which saved the situation, otherwise it would have been extremely precarious.

14. Q. In answer to question No. 8 you refer to reservoirs; I suppose these are very small?—Yes, they are very small. I don't think any reservoir would irrigate from its own water more than 50 to 100 *bighas*; in some cases where streams are diverted they irrigate more.

15. Q. Is a reservoir and *ahar* the same thing?—Yes.

16. Q. How much is a *bigha*?— $\frac{1}{8}$ of an acre.

17. Q. In answer to question No. 9 you say "a programme should be drawn up for each village or group of villages where irrigation work is needed through the agency of the Tahsildars in Government estates and of the proprietors in private estates." You don't contemplate any large irrigation works?—I should be very glad to see some of these schemes which the Public Works Department have dealt with, carried out. I am inclined to doubt the criticisms made as to the poor financial prospects of the schemes. I think they would pay.

18. Q. Mr. Macconchy, referring to the Nadaura scheme, sums up his report as follows:—"The weak point of this scheme is the inadequacy of the source of supply, the catchment basin being so small and so close to the commanded area. There is almost a certainty of failure of supply in years when it is most wanted, and the number of years in which the supply would be both available and useful is too small to allow of the scheme being looked on as a desirable one for Government to carry out. It would in any case be worked at a loss, which its lack of real utility would not justify." Do you agree with that?—I don't think that criticism is just; 1873 and 1889 were the only years in which the rainfall was not sufficient to make the scheme a success; and it is very seldom indeed that the extra water would not be useful.

19. Q. You think Mr. Macconchy takes too despondent a view of the scheme?—I think so; besides there are some difficulties in the way of his criticising the scheme; the chief is his want of knowledge with regard to the system of tenure of land. In ordinary Bengal districts the only way you can get a return is in the shape of a water cess; in our district the land is entirely zamindari and enhanced rents can be got; the zamindars, if they carry out a scheme, are entitled to get entire benefits from the *rayats*.

20. Q. (Mr. Muir-Mackenzie.)—Are they cash rents?—Yes, in the majority of instances.

21. Q. (The President.)—Would you like to see the Nadaura scheme carried out at once or reserved as a famine relief work?—At once. We have estimates in the Civil Department in which the cost came to only Rs. 10,000. I

have worked out the figures on that basis, and I think Government would be reimbursed for the outlay. I don't know on what basis this estimate of Rs. 77,000 of the Public Works Department is based.

22. Q. It must be a bigger scheme than yours, I fancy?—Yes, there are four or five distributary channels, while ours had only two.

23. Q. The area commanded is only 5,375 acres?—Yes; it is impossible to get a large scheme in Palamau.

Mr. Horn.—These schemes were worked out in detail 25 years ago; there are plans and estimates in the Superintending Engineer's office. Mr. Macconchy brought them up to date.

24. Q. (The President.)—In your answer to question No. 10 (a) you give the amounts of Government loans advanced during the past six years under the Land Improvement Act. What are they generally taken for?—Purely and simply for irrigation works.

25. Q. For making *bunds*, etc.?—Yes, and for dams across the rivers.

26. Q. Could you have spent more money if you had liked?—Yes, I think the zamindars were not aware that Government was prepared to make such large advances. In 1897 they were very grateful for the money given and said it would be a source of great profit to them.

27. Q. In Bihar and elsewhere we have found no particular keenness about loans and a good deal of complaint about the circumlocution; could it be made easier do you think?—I think it could be made distinctly easier in regulation districts; this is a backward district and the conditions of Palamau are somewhat different. The machinery requires a little oiling.

28. Q. The rate, I suppose, is 6½ per cent.?—Yes.

29. Q. Does the rate object to that part of it; would he like to have a reduction?—No; he objects to the trouble of coming in to the Kachheri and to the enquiries that are usually made.

30. Q. Have you Sub-divisional Officers?—No.

31. Q. Is there anyone but yourself who can grant advances?—No; it is all done under my signature.

32. Q. You say in reply to question No. 10 (c), referring to the extension of private irrigation works—"their construction may be encouraged by free advances or Government loans." Do you mean without interest at all?—No. What is meant is that they should be freely given.

33. Q. (Mr. Muir-Mackenzie.)—You don't mean grants-in-aid?—No; I think that would be fatal. The benefits are so very high. The improvements effected often yield as much as 75 per cent. interest in the shape of increased outturn.

34. Q. (The President.)—You have a permanent settlement?—Yes.

35. Q. That is not usual in Chota Nagpur?—I am not aware. In my district it is the result of clemency of the Government. Originally the entire district was the property of the Palamau Raja; he gave out his land to jagirdars and collected rents in return for services on the estate; when the Raj was sold up for arrears of Government revenue, all the jagirdars held the same position in respect of Government that they had held with the Raja. Government, instead of adhering to all the conditions and resuming the estates on failure of the male line, has given them permanent occupancy rights.

36. Q. You say in reply to question No. 11 (b), referring to wells, it is very desirable to stimulate their construction?—That will have very little effect on any farming question; it refers to vegetables.

37. Q. Not to rice?—No, nor wheat; it is only wanted for crops near villages—sugarcane and tobacco; sugarcane is very important.

38. Q. Have you as much money as you would like to give in *takavi*?—I think that Government is perfectly prepared to be liberal in the matter and will give as much as I would like; every year we are asked for an estimate of our requirements and the amount advanced depends on that.

39. Q. Is it worth while to stimulate it?—Yes, certainly. There is nothing that will benefit the district so greatly or do more towards warding off bad seasons and famine.

40. Q. In 1897-98 you had a respectable sum and it has gone down to Rs. 3,000 this year?—Yes, that is because we have not tried to make the zamindars take the advances; in famine years we did try to do so.

41. Q. You hope to do so?—Yes, I want to. They are fully alive to the benefits of irrigation, but have not the capital to carry it out.

42. Q. What style of famine works have you in this district?—They are chiefly irrigation *bunds* and *ahars*; many have been started and left incomplete; their maintenance has been neglected; formerly in the Government estates there were *tikadars* to whom the village was let out in rent; they often took loans for the construction of *ahars*, and during their tenure they were allowed to make all the profits they could. Now we have taken the whole thing under our own management and there is no such inducement.

43. Q. Do you expect to stay here long?—One or two years.

44. Q. (Sir Thomas Higham.)—With regard to your answer to question No. 1, what is the area irrigated by Government works?—The figures given relate to rice lands below *ahars* on Government estates; these *ahars* are not, however, Government works. The figures given are extremely incorrect.

45. Q. The area is said to be for the whole district?—Yes. This also is incorrect.

46. Q. You say in answer to question No. 4 "the rainfall is so precarious in this district that almost all the winter crops are dependent on artificial irrigation." What you mean is that it is desirable they should have it?—Yes.

47. Q. But they don't have artificial irrigation provided always?—Not always. I think the proper answer is that, as a matter of fact, somewhere about 80,000 to 90,000 acres are actually capable of being irrigated and that though rice lands are not absolutely dependent on it, they are better for irrigation and that the outturn would be improved by it.

48. Q. You say, if there is a failure of rain before the middle of September, *ahars* are not used?—No, I don't say so.

49. Q. Is there ever a failure of rain before the middle of September?—There have been only two years of failure that I am aware of in the last 30 years.

50. Q. Would not the *ahars* always be filled by the beginning of September?—I think probably they would.

51. Q. By the end of September irrigation would be exhausted?—Yes.

52. Q. And there would be nothing left for October?—No.

53. Q. You say revenue should be got out of zamindars, land, supposing Government made irrigation works?—I don't think, under existing circumstances, we could get anything out of it. We have several large landholders who are distinctly good zamindars and who are ready to take loans for irrigation work if it could be managed. I think they should be encouraged to do the thing themselves.

54. Q. If Government made works that would irrigate zamindars' land, would they make their own channels?—I think so and they would pay a contribution towards the cost of any *pakka* masonry for a weir.

55. Q. On Government lands would you look for a return in increased rent?—Yes; also in collection of rents.

56. Q. In how many years?—In the majority of cases as soon as the water came; there are other lands on which there would not be a return sooner than from three to five years.

57. Q. Why so long?—The land is very uneven and would require terracing.

58. Q. Rent is not fixed for a definite term?—We have a settlement for 15 years.

59. Q. Could you raise rent before that?—The Board of Revenue have decided that we could not; I think we could. If we were in a position to say to a man "by the expenditure of Rs. 1,000 on any irrigation work we will double the outturn of your land, will you pay a higher rent or go on as you are now," I think they would gladly agree to pay the higher rent.

60. Q. You are in favour of the *Nadama* and other schemes being carried out?—Yes, very much.

61. Q. Don't you think they would fail in years when they were most wanted?—No, I don't think so; they might fail one year in 30, but in the meantime they would have done so much good in improving the position of the tenantry, landlords, and Government that we should all be in a better position to withstand famine; that one year would not hit us so hard.

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Mr. F. T. Lyall. 62. Q. They would have to be in all cases worked by means of filling *ahars*?—Yes.

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63. Q. It would not be direct irrigation?—No.

64. Q. Has there been any increase in the number of *ahars* in the last few years?—Yes; before the 30 years' settlement there were in the Government estate only 190 and at the end of it 1,100.

65. Q. How long ago was the settlement?—It ended in 1896-97.

66. Q. Are they going on making *ahars* now?—Yes; some were made in the famine of 1896-97 and some more in the famine of 1899-1900.

67. Q. Is that a regular part of your famine programme?—It is the most important feature in it.

68. Q. Have you a programme of relief works now?—Yes.

69. Q. Had you relief works last year?—No, in 1899-1900.

70. Q. Is your programme complete now?—Yes, it is supposed to be. We have the names of villages where *ahars* are required and are to be repaired, but at the same time we have not got plans of the *ahars* that are to be made; as a rule, they are so small that plans and estimates are not required.

71. Q. These *ahars* are to be made as relief works; are they in Government estates?—Mostly. Sometimes they are in private estates.

72. Q. At the cost of Government?—Yes.

73. Q. If a man asked for an *ahar*, would you put relief labour there?—If it were absolutely required as a relief measure.

74. Q. Would he contribute anything?—No, not if it were made in a famine year.

75. Q. You don't mind their being made in that way?—I don't think it is proper to make them in the villages of large zamindars who can afford to borrow the money to do the work themselves.

76. Q. How are sites fixed; is anybody on the look-out for sites?—Yes, we have Tahsildars doing it. This is a matter I have taken up strongly; I have had a register prepared of existing *ahars* when repaired and the cost incurred; also of sites for new *ahars*.

77. Q. On Government estates?—Yes.

78. Q. Not elsewhere?—No; we have to apply to the zamindars.

79. Q. What proportion are Government estates of the whole?—One-tenth.

80. Q. (Mr. Muir-Mackenzie.)—Have you any difficulty in getting land out of zamindars for irrigation works?—No, never.

81. Q. You don't pay anything for compensation?—No; possibly in one *pergunnah* we might have to; the circumstances there are different to the rest of the district.

82. Q. Would you like to have a survey of the country made so as to fix good sites?—For the larger schemes it would be excellent, but not for the smaller ones.

83. Q. It is quite easy to choose the sites?—Yes, they are very obvious indeed.

84. Q. Is this programme of yours based on the number of sites already fixed?—Yes.

85. Q. Who chooses the sites?—As a rule, it is the subordinate establishment, and during the cold weather I make it a point to look up these sites; I found in the past several had been very badly chosen and there has been a waste of money in consequence.

86. Q. If sites are not carefully designed, there is fear of waste?—Yes.

87. Q. Would it not be advisable to have a survey for sites?—I don't think it would repay you. The District Officer can go round and see them.

88. Q. Must the District Officer be the Collector?—Yes.

89. Q. Could he cover the whole district himself?—I think so; one cold weather is enough.

90. Q. From this paper issued by the Revenue Department it would appear that the demand for relief work is likely to be very small in your district?—Yes.

91. Q. Therefore you would not get very much in the course of the famine?—Very little.

92. Q. For real extensions of works you would have to rely on what?—Works undertaken by zamindars.

93. Q. Is there any room for more schemes for filling *ahars* from streams?—Yes, there is a good deal of room.

94. Q. Have you done anything of the kind?—I was met by an absolute *impasse* from the Board of Revenue in the matter of the Nadaura scheme; they said nothing should be allowed during the currency of the settlement unless it would be shown to be lucrative, while at the same time rents were not to be increased.

95. Q. There is absolutely in this district no chance of the people being backward in taking water?—No, they howl for it.

96. Q. Will they pay for it?—Yes, in the shape of enhanced rent. They have often begged me to make *ahars* over their lands and take payment in the shape of enhanced rent.

97. Q. Is there any difficulty from the point of view of organization in making these *bunds* as famine relief works?—Their being small and scattered, it is very difficult; it means an immense amount of labour and supervision for the District Officer.

98. Q. Still it is not an insuperable difficulty?—No, you must have an energetic officer.

99. Q. There is no insuperable difficulty in getting establishment?—As a rule, I should not have famine principles at all; let the work be done as piece-work.

100. Q. What is the principal feature of your *tenure* which enables a zamindar to get increased rent?—They are tenants-at-will. The Tenancy Act is not in force.

101. Q. If a zamindar is able to get a substantial profit easily from the making of these, apparently, not very expensive improvements, how is it that he has not done so up to the present?—He is a very backward man, as a rule, and he has never been taught very much. His expenses are heavy and he has not much spare capital at his command. The Nawa Government estate, which was under the Court of Wards management, is an example of the benefits accruing from irrigation. There was no enhancement of rate, although there was enhanced rent.

102. Q. Did they increase rent on account of improved classification?—Yes; 2nd class became 1st. In 13 years the rent roll was increased from Rs. 12,361 to Rs. 26,170; the schedule of rates was not altered; the expenditure on irrigation was Rs. 11,557.

103. Q. That was done under the Court of Wards?—Yes.

104. Q. Since the Court of Wards' time?—The further figures are not reliable, because they are gathered by native agency. From the same estate we may, as an example, take one work alone. The expenditure in the village of Nawa is put down at Rs. 1,000; the approximate area irrigated is 275 *bighas*; before the construction of the *bund* Rs. 181 was got in the matter of rent, which has since been increased to Rs. 250; in addition to that it is stated that from rice land which he cultivates for himself; the yield before was 450 maunds; now it is 3,500. It has increased in actual rent and outturn.

105. Q. You say under the Board's orders you were powerless because you could not enhance the rent during the period of settlement. You said also that rayats would be willing to accept enhancement if improvements were made for their benefit. Don't you think Government should have the legal power to enhance if they improved the water-supply?—Yes, most certainly; I put very great stress on that.

106. Q. To come to the distribution of advances. Do you think the Collector does not require any more help in distributing advances? Would you be inclined to have certain powers delegated to some subordinate officers?—Yes, I think so. I would not go as far as to delegate powers to the Tahsildar. I would not go below a Sub-Deputy Collector on Rs. 120 to Rs. 150.

107. Q. How far would you allow him to go?—A couple of hundred rupees.

108. Q. What period would you allow for the repayment of these advances?—I think for the large schemes certainly 30 years; there are no schemes in my district except the Nadaura that would require such a long period. For most of the schemes 20 years would be quite ample; for anything below Rs. 5,000 ten years would be enough. Another point is the delay in the repayment of the first instalment, I would give the borrower two to three years at least,

because he gets no return for the first year or two, especially in Palamau, because of the time it takes to get your new rice lands under cultivation owing to difficulties in levelling and so on.

109. Q. The prospects of getting water is sufficient to induce the tenants to undertake the labour?—In most cases it is not. The zamindars often do the terracing and levelling and then let out land on quit rent.

110. Q. Would advances have to cover the expenses of levelling as well as expenses of bunds?—I don't think it would be absolutely necessary. If they require it, I would not hesitate to let them have it.

111. Q. You seem to have no apprehension that you would get as much money as you required for advances; how much could you get through in a year?—The people would require a good deal of education; just now I could get through Rs. 50,000 to Rs. 1,00,000.

112. Q. Have you much trouble in the working of the existing small irrigation works like *ahars*?—Very little.

113. Q. Is there any trouble from people cutting bunds?—Very little so far, but my experience is not large.

114. Q. Have you a record-of-rights?—In Government estates there is; nowhere else.

115. Q. Have you a record-of-rights in water?—No.

116. Q. Do you think it would be possible to have it?—Yes, but I do not think it is a burning question now.

117. Q. In this district disputes about water don't go into the Civil Courts?—Not much. There is one case in which Government has lost the entire right to the water in a stream owing to the adverse decision of the Civil Courts; that is 30 years' old, and it has affected us prejudicially; if it had been appealable, I should have appealed. I am considering whether Government should endeavour to secure rights therein somehow or other.

118. Q. Whose business is it to repair the *ahars*?—In Government estates it is the duty of the Deputy Commissioner and his staff.

119. Q. And on zamindar's estate?—The zamindar does it himself; unless there is a *fikadar*, then he does it.

120. Q. It is not the tenant's duty?—No; the tenant is supposed to do nothing more than fill up rat-holes, etc., and other minor damage.

121. Q. Is any record-of-rights going to be introduced in zamindar's estates?—That is not under discussion at present.

122. Q. There is no occasion in this district for any special legislation?—Very little. There is another point; the slopes in the district are so great that the water is never long in reaching a big stream and many people's rights are not concerned.

123. Q. If you make *ahars*, you have no apprehension of difficulty in getting them kept in repair?—No; they will require some inspection.

124. Q. And on zamindars' estates?—I don't think Government can inspect there.

125. Q. How will you make them do their duty?—I think they should be given loans to construct their own.

126. Q. Once having made them, it is important that the repairs should be kept up?—I think the feeling of self-interest will suffice. It is only themselves who are harmed if there is neglect. It is difficult to see how anything more is to be done. If you give a man money and he repays it, what more can you do in the matter? If you made the *ahars* by Government agency, it would be a different thing.

127. Q. You would not make it a condition in giving an advance that the thing should be kept in repair?—It would be difficult to enforce such a condition. If a breach occurred, you could not say if it was due to neglect or anything else.

128. Q. You think there is nothing for it but to leave it to the self-interest of the man?—Nothing, especially in the case of the bigger zamindars.

129. Q. Could there be any large extension of wells in the vicinity of villages?—Yes.

130. Q. If advances were given with liberality for wells, would they take them?—They require education; some would take them, but not many.

131. Q. Is there anything like the same demand as for bunds?—Nothing like it; this is greatly due to the rocky nature of the sub-soil and well-sinking is very difficult there.

132. Q. Still you would be glad to have money in your hands for the purpose?—Yes, certainly.

133. Q. Do you think the transfer of officers has led to any discontinuity of policy in such matters?—Yes.

134. Q. It is important to keep a man who is interested in such things?—Very important, especially in non-regulation districts.

135. Q. (Mr. Rajaratna Mudaliar.)—You said the Board of Revenue's objection to enhancement of rent during the currency of the settlement prevented your carrying out certain irrigation works; on what grounds did they raise the objection?—I cannot say. The letter reads as follows:—"The Board are of opinion that there should be no enhancements of rents during the present settlement whether the rayats are willing to accept enhancements or not."

136. Q. Do you issue a notification during the time of settlement?—Yes.

137. Q. Could you not get over the difficulty by inserting a saving clause to the effect that during the currency of the settlement if works are constructed by Government there should be enhanced rent?—Yes, the Board have simply to say that they agree to it.

138. Q. You said in one estate the classification was raised?—Yes.

139. Q. I suppose zamindars could also effect such enhancements if they carry out improvements?—Yes.

140. Q. Have they carried out any improvements?—Yes, they are absolutely unfettered.

141. Q. I am referring to occupancy tenants?—There are none except in Government estates, and in Government estates occupancy tenants have no powers of alienation.

142. Q. In Government estates I suppose lands which are assessed at 1st class rates cannot be enhanced?—I would not enhance them during the currency of settlement; I think that would be a breach of faith.

143. Q. Could you enhance 2nd class to 1st class?—I don't think there would be any objection.

144. Q. Supposing it is unirrigated?—If rice land is unirrigated, it is 3rd class and would not be classed as 1st class.

145. Q. (The President.)—And if *rabi* land?—It might be classed 1st class then.

146. Q. (Mr. Rajaratna Mudaliar.)—Since 1896-97 you have granted Rs. 68,829 in loans for 279 reservoirs. Do you happen to know what area has been benefited by those works?—No, but a large area must have been benefited.

147. Q. That was done chiefly the famine relief?—Rs. 30,000 of that.

148. Q. Is the condition of these works fairly satisfactory?—I have not seen many. I have spent most of my time on the Government estate, but such as I have seen, seem fairly good and some very satisfactory.

149. Q. Do any of these require to be completed?—Yes, to a certain extent. The distribution channels or *pains* are not all out, and sometimes there is a little earthwork requiring to be done. The majority are completed, though the benefit to be derived from them has not yet been fully obtained. That is to say, the new rice lands have not yet been made.

150. Q. In answer to question No. 1 you give the annual gross area cropped as 738,600 acres. On page 79 of the Bengal Report on Protective Irrigation the area given against your district is over 900,000 acres—the average of three years apparently. In a statement furnished by the Bengal Board of Revenue, giving the averages of five years, the area is only 698,100 acres?—It is difficult to explain this. The figures in my statement are those accepted by the Director of Land Records.

151. Q. (Mr. Allen.)—There is some mistake. The figure for 1901 was 677,400. There has been an increase probably?—It is extremely difficult to give you a correct figure for the district, because only one-tenth has been actually surveyed. The total area cultivated for that one-tenth has been put down at about 60,000. About 600,000 or 700,000 is the probable figure for the district. There is a statement here showing what money we were able to advance on the famine year. There is no reason why as much should not be advanced every year. I have figures from various other zamindars showing the enormous benefits that accrue to them from irrigation. The eventual return is seldom less than 20 per cent. and usually between 40 and 100 per cent. on capital expenditure.

152. Q. (Mr. Muir-Mackenzie.)—We are not to regard the instance you have given us an exceptional case?—No. You have another case in our settlement rent roll. There has

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Mr. F. T. Lyall. been an increase from about Rs. 35,000 to about Rs. 74,000 in, I think, 30 years, and it is claimed there has been no increase of rates at all. The Settlement Officer said in his report that this is entirely due to the introduction of irrigation. More than half the existing *pains* at the time of his settlement of 1896-97 were in disrepair, and it has been owing chiefly to that we have had such enormous difficulty in collecting our rental. I have had a year's rent in arrears. Now I hope this year to be able to get sufficient collections to make up for past bad years.

153. *Q. (Mr. Rajaratna Mudaliar).*—The gross area of the district was over three million acres. I suppose the difference between the occupied area, 600,000 to 700,000 and the gross area, is all hill and uncultivated?—Yes, and there are large forests.

154. *Q. (Mr. Muir-Mackenzie).*—There is a considerable amount of cultivable waste?—A tremendous amount.

(Mr. Allen).—About 600,000 acres cultivable waste. A great deal more in reality.

155. *Q. (Mr. Rajaratna Mudaliar).*—I suppose want of population?—In this estate I have spoken of they (the Court of Wards) tried to run a scheme of immigration of imported labour, but I do not think it really requires that.

156. *Q. (Mr. Allen).*—You were Sub-divisional Officer in the Sevan District of Saran. Did you see the work done by Mr. Tytler in extending well cultivation by making advances?—I saw a great deal of it.

157. *Q.* What opinion did you form of the benefit resulting from the extension of wells?—It was very great indeed.

158. *Q.* Do you think more might be done by extending well cultivation independently of the Opium Department by means of *takavi* loans?—Yes, but it is difficult to do, because you never have the personal relation with your tenants that the Opium Officer has. The population is too large for a man to get into personal touch with. But there is a great deal to be done.

159. *Q.* Which may be done by a special officer?—Yes. Or if you let it be known through the police.

160. *Q. (Mr. Muir-Mackenzie).*—Through the police?—I do not mean to say that the police should give them money; simply to tell them through the chankidars that money is available if they will come to head-quarters.

161. *Q. (The President).*—Mr. Tytler's was a special work?—He must have spent three or four hundred rupees out of his own pocket to help the rayats with medicines. He had most extraordinary relations with them and his was very exceptional work done for Government. He had 80,000 tenants and personal relations with all of them.

162. *Q. (Mr. Allen).*—Do you recommend the granting of *takavi* to rayats?—They won't take it in Palaman. They are tenants-at-will and have no security of tenure. They may make the improvement and be ousted from their lands. In Government estates some will take it, but even there they are liable to have enhancement of rent.

163. *Q.* Do you think rayats ought to have enhancement of rent for improvements made by them or to have an immunity similar to that given under the Bengal Tenancy Act?—It would be a good thing, but it would mean the taking away from the zamindars many of the rights that they have now in having these men as tenants-at-will. They have not appreciably abused them so far.

164. *Q.* But would it not be a good thing to prevent the zamindar enhancing the rent owing to increased profits of the rayats by improvements effected by themselves?—The position now is that the rayats are not making improvements.

165. *Q.* If the rayats took *takavi* from Government now, would the first thing that the zamindars would do be to jump up their lands?—I think so.

166. *Q. (The President).*—At once?—If they were bad landlords.

167. *Q.* There is nothing to prevent them by law?—Absolutely nothing. The only man who makes an improvement is the man who gets the lease of a village; and the custom of the country is that if he chooses to make an improvement in the matter of *ahars* or reservoirs, he is given half the cost by his landlord and is entitled during the currency of his lease to take all the profits he can get, and at the end of the lease the village goes back to the landlord and he resettles it again, usually at an enhancement of 25 or 50 per cent. Rentals are increasing very very largely in the district.

168. *Q. (Mr. Allen).*—You told Sir Thomas Higham that this 8,000 acres irrigated from Government works is

probably a mistake. Is it not the case that Government spends a considerable sum in constructing and maintaining *ahars* in the Government estate?—No, I do not think it has regularly in the past. I submitted a long report to Government on the subject.

169. *Q.* But money has been given this year?—Yes; I got Rs. 25,000 from Government.

170. *Q.* Was that for construction or maintenance?—Chiefly for repairs. There was a limit of about Rs. 4,000 for construction. A certain percentage of the rent roll is set aside for improvements. It is not nearly sufficient in a district like this. If Government wishes to make an estate like the Khas Mahals a paying concern, they must make a great deal more improvements.

171. *Q. (Mr. Muir-Mackenzie).*—Was it not the business of Government to make these repairs without enhancement?—Yes.

172. *Q. (Mr. Allen).*—Your proposal to enhance land during the currency of the settlement referred to large new schemes?—Original schemes; they need not be large.

173. *Q.* In a case like the Nadaura scheme, in addition to the actual increase of rent which the Government might obtain, would it not also gain something in the increased security of its collection?—Very much.

174. *Q.* What is the percentage of your collection now?—Mr. Eachcroft has submitted returns for three years, of which two were very good years and one a bad year, and he showed that our collections were only 83 per cent. of the total demand. That is a very heavy arrears, and just now about a year's rent is in arrears.

175. *Q.* To what extent can that percentage of collection be improved if Government spend more money?—In ordinary years, we ought, on a settlement like this only lately finished—supposing our classifications be correct—to get a cent. per cent. collection. The Settlement Officer recorded in 1897 in his report that unless these repairs, for which I obtained a special grant this year, are undertaken, Government must look for arrears of rent.

176. *Q.* What is the conditions of the rayats in the Government estate, prosperous or the reverse?—Very much the reverse. They have been impoverished to the last degree.

177. *Q.* Have they been abandoning the estate?—In considerable numbers. There is one outpost area which is reduced by very nearly 25 per cent.

178. *Q. (The President).*—Where do the people go to?—Anywhere; into Ranchi or elsewhere. The competition for rayats is very great in the district.

179. *Q.* What is the abandonment of their holdings due to?—Many causes; to a great extent to this matter of irrigation; also to a very large extent to police oppression, the formation of forests and restriction of their rights of burning and grazing; and also to oppression on the part of the Government Tahsildars.

180. *Q. (Mr. Allen).*—Is it partly due to the failure to maintain the *ahars*?—Yes; we have had most bitter complaints about it.

181. *Q. (The President).*—How long has that gone on?—I think five years.

182. *Q.* Years of high prices and hard times?—Yes. Previous officers have given returns of good crops, showing that rents were low and that the tenantry are well off. I cannot find it so. It is my personal opinion, and I have toured a great deal and gone into it very carefully.

183. *Q. (Mr. Allen).*—You have Mr. Horn's note on the projects in Palaman in which he says "Mr. Maconchy states that the area commanded is 5,375 acres of which half might require water if made available." Is that a correct estimate?—No; that is very excessive.

184. *Q.* What do you base your opinion on?—I understand that he means that the area within which water can be introduced is 5,375 acres. I do not think that half that area is under rice.

185. *Q.* It ought to read "the area commanded is 5,375 acres, of which a quarter might require water"?—Yes.

186. *Q.* That affects the statistics right through as to the amount of water required. There are no details given in these estimates as to the cost of earthwork. What would you consider the proper rate to pay for earthwork on these schemes?—In the Khas Mahals 650 cubic feet to the rupee. It works out at Rs. 1-9 the thousand cubic feet.

187. *Q.* In Mr. Maconchy's note on the Peeres scheme he states that as Mr. Carter (P) makes no mention of *ahars*

as in the previous scheme, there are probably none. Is that correct?—No.

188. Q. Are there as many *ahars* there as in the previous scheme?—In that matter it is one of the best off parts of the district.

189. Q. You gave us some statistics as to the increase of rents in the Nawa estate due to irrigation. Have you any more figures?—Yes. Thakuraj Gobind Pershad Singh, Zamindar of Ranki, wrote to me of the Tara scheme, on which he spent Rs. 7,000. He shows that before the construction of this work he had only 200 *bighas* of rice land. Now he has got 300 and he exports in addition 250 *bighas*. The outturn has been raised from 10 maunds to the *bigha* to 25 maunds (*kachcha* maunds).

190. Q. What is a *kachcha* maund?—Eleven-twentieth of the standard maund.

191. Q. Of rice, not paddy?—Of paddy. Kuar Laljivan Sinhu was another zamindar to whom we advanced money. He says "my paddy fields of village Temrai yielded about 2,000 maunds of paddy, but I used to get no paddy in a failure of rainfall, so that the average yearly produce did not amount to more than 600 or 700 maunds; but since I have constructed a *bund* at a cost of Rs. 3,000, I get 2,000 maunds every year." It is important in this matter to quote from Mr. Macdonald on rainfall. He says that one year out of every four is a dry year. There must be irrigation to get anything above an 8-anna crop. The zamindar further says "similarly in the case of Kudaga village I get 1,500 maunds of crops every year since I have constructed a *bund* at a cost of Rs. 6,000, though the average yearly produce was not more than 800 to 700 maunds before." Again "my lands of Nawadah village have been converted into paddy fields by the construction of a similar *bund* at a cost of Rs. 2,500, and the average yearly produce has been increased from 200 to 600 maunds."

192. Q. In these estimates a provision is made for the acquisition of land. Would it be necessary to pay for land you might require for weirs or channels?—No.

193. Q. (Mr. Rajaratna Mudaliar.)—Not necessary to pay compensation?—No; they are all tenants-at-will.

194. Q. In Government estates is there not a sort of qualified occupancy right?—There we simply take the land and give them more valuable land elsewhere. We do not have to pay in money.

195. Q. (Mr. Allen.)—In the settlement tables it says that third class rice land is equally rented with first class *rabi*. But it is twice as a rule; third class rice is double first class *rabi*?—In one or two pergunnabs it is so.

196. Q. That shows the enormous value of rice as compared with *rabi* in the district. First class land seems to be irrigated; second class not always irrigated; and the third class depends on rainfall. I should like to make it quite clear. The increase that Government might obtain would

be, firstly, from the rising of land from one class into a higher one; secondly, by the imposition of rent on newly cultivated lands; and, thirdly, by the security of collection?—Yes.

197. Q. And, as regards enhancement of rent, can you give us any idea what that would average over an area?—I could give figures for every village which was affected; that is, we have a list of all the fields classified at such and such a rate.

198. Q. On what basis would you work out such an estimate? Would you assume that the land of all the lower classes was raised a class?—No. We could not go quite so far as that. We should have to go on to the lands and see how much we thought would be affected.

199. Q. Has any estimate like that been worked out?—Yes, for the imperfect figures for the Nadaura scheme.

200. Q. What was the result?—The result of an increase in this Nadaura scheme of Rs. 1,000. It was estimated the scheme would only cost Rs. 10,000.

201. Q. (Mr. Rajaratna Mudaliar.)—You just said that the tenants in Government estates were in an impoverished condition. Would not that be due in some measure to the rents having been raised from Rs. 11,500 to 26,000 or 27,000?—The figures you quote refer to the Nawa estate. The enhancement of rents in the Government estates affected their condition, but only in a measure. The rents were in many cases fair if the irrigation works were kept in repair. But in some pergunnabs they have a system under which a village is divided into shares. A man was given a lump, and he was told "your rent is so much and you can cultivate as much as you like." But now we have introduced rent for every acre of land brought under cultivation. They object to that very strongly.

202. Q. The current fallows are about 600,000 acres, with a crop area of 100,000; that is a large proportion. I suppose the tenants have to pay for such fallows?—They need not to have to, but now they have to. Up to now they have avoided that by bringing new lands under cultivation. Now we have a system of keeping our records up to date, and we impose revenue on every piece of land under cultivation. I do not think we ought to. It only comes to 2 or 4 annas a for these *bigha* uplands. They are not supposed to relinquish a part of their holding. That also presses hard on them at times. The Deputy Collector has perfect discretion in the matter; he can recommend rebate to the Board.

203. Q. I find from the Bengal Government memorandum that in this district provision is made for famine relief for 1·9 per cent. of the population of the area liable to be affected. Could you not find works for making a larger provision?—These schemes that have been taken up by the Public Works Department are the only large ones we have. We have a certain amount of large road works on which we could also employ them.

Mr.
F. T. Lyall.
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WITNESS No. 53.—MR. S. C. SEN, Vakil of Manbhum.

1. Q. (The President.)—Do you possess property in Manbhum?—Yes.

2. Q. Do you consider the whole of your district subject to occasional drought and famine?—Yes.

3. Q. Answering question 2 you divide your district into two parts, north and south of the Damuda. Is that on account of the nature of the soils?—And also of the presence of the collieries.

4. Q. So that, when the scarcity was bad there, the people had something else to turn to?—No, in the matter of water-supply. The colliery waters should be stored in big reservoirs; at present the water goes off into the Damuda—a very large quantity.

5. Q. Would it fill a big canal?—I should think so. You will find a very large number of collieries in each village, eight or ten, each pumping a large quantity of water, and for fifty villages the quantity of water would be enormous.

6. Q. Would not the best plan be to utilise it after it had got into the Damuda?—My suggestion was to utilise the water by storing it up in big reservoirs.

7. Q. If the Government made reservoirs or gave some means of expelling water, would the people take it every year?—Whenever necessary.

8. Q. But how often would it be necessary? Once in three or four years?—For the last nine years it has been necessary every year.

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9. Q. And they would be willing to pay for it?—I do not know if Government would be entitled to get any cess. If Government undertakes to do work, it ought to pay for it.

Mr. S. C.
Sen.

3 Nov. 02.

10. Q. Not charge for water?—No. The Public Works cess was introduced to prevent famine.

11. Q. Are the people, with whom you are familiar, willing to take loans to carry out works?—Yes; but the loans are not used for the proper purposes in most cases.

12. Q. In other parts of India we have found great advantage taken of the system of loans for irrigation works?—The people in this part of the country are not so well educated and they are very needy.

13. Q. Are the *bunds* in villages generally kept in good repair?—No.

14. Q. Should any pressure be put on the zamindars or on the rayats to keep them in repair?—Yes, on the zamindar for those which are his property, and on the rayats for those excavated by them.

15. Q. You say that existing *bunds* could not be extended without destroying the paddy lands adjoining them. But *ahars* could be deepened?—Yes.

16. Q. And the *bunds* built up with the *warli* *chakra* out?—Yes. The reason is this—the *ahar* in this country is made by putting in one or two *bunds* in which there are three or two natural *bunds*, and immediately below the new works the paddy lands grow up. These are irrigated by

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Sen.

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the recollection of the water. But if you want to extend this *bund*, you must naturally remove the embankments and destroy the land.

17. Q. You think *bunds* are preferable to wells?—Yes.

18. Q. What is the objection to wells?—A well can irrigate a very small area, and a *bund* made with the same amount of money would irrigate a larger area.

19. Q. (Mr. Rajaratna Mudaliar.)—But with the *bund* you would get no water if there is a failure of rain and a well has springs?—I have not seen a *bund* running dry through a failure of rain. They are dry if the *ahars* are broken. Generally there is a large accumulation of water in a *bund* that is properly made.

20. Q. What area would be irrigated by a well?—About 10 *bighas*, 3 acres.

21. Q. What would it cost?—At least Rs. 500.

22. Q. Regarding the misappropriation of loans; suppose they are given in instalments after a portion of the work has been actually done?—It would be minimised.

23. Q. As regards the reduction in the rent recoverable from men who have constructed works, do you cancel it if the work is not kept in order?—No. The settlement is permanent after the *bund* is made.

24. Q. Would it be a good plan to do so?—No, because he suffers equally if his land is not irrigated.

25. Q. You might enforce this?—When such arrangement is made at the time, *jalsassan* settlement is made, yes.

WITNESS No. 54.—RAJA BHAGWAT DAYAL SINGH, Chainpur, Palamau.

Raja
Bhagwat
Dayal
Singh.

3 Nov. 02.

1. Q. (The President.)—In which district are your lands situated?—In Palamau District in the Chota Nagpur Division.

2. Q. I suppose you have been long a resident in this district?—Yes, from several generations. This is the 18th generation that I have been in this district.

3. Q. And do you consider that irrigation is a very valuable thing in the district?—Certainly, irrigation is a very valuable thing. Our district is very hilly and rocky, and without irrigation it cannot yield anything at all.

4. Q. You have a good deal of rainfall there?—For the last six or seven years we have had very bad rainfall. Since 1896 or 1897 our crop is always failing.

5. Q. Do you think that if you had good irrigation works in your district, that the people would take irrigation every year?—Yes, every year without fail. Our country is very dry, drier than Purulia, I think, and all the people are very much in need of irrigation.

6. Q. Would they be willing to pay a water-rate?—Yes, quite willing.

7. Q. How much could they pay?—They can pay anything. Up to this time we have only erected *bunds* for irrigation purposes.

8. Q. Do you know the Shahabad District where the Sone canals are?—I know it very well.

9. Q. Would they pay as much as the people pay there?—Yes, I think so; they would pay even more than Shahabad, I think. They see that the Shahabad people are doing very well, and people there, whose lands did not yield before, have, since they have got the canal and irrigation, become very well-to-do.

10. Q. I suppose that the kind of irrigation you have in your lands is all by *pains* and *ahars*?—Only *pains*, and we use some small rivers for irrigation. We make *bunds* and get first of all a reservoir and from that we irrigate our lands.

11. Q. Do you think anything more than that is necessary? Do you think any large works would be suitable in your district?—There are many big rivers like the Koel, Aurnath, Kundhar, Myia, Tullir, which might be utilised, but they always get dry in the hot weather.

12. Q. Have you looked into the figures of this scheme at all? Do you happen to know what the cost will be?—I have the experience of my own estate where I have been working for the last 25 years, and I have got some experience with other big works, just as I have with small works.

13. Q. Are the people in your lands willing to take loans from the Government to help them in irrigation?—All the zamindars of Palamau have taken loans from Government and we have done lots of good work. Of course there may have been some people who misappropriated the money, but lots of them have done very good work.

14. Q. Can they get loans quite easily?—Yes. They all get loans and all of the loans have been refunded to the Government with interest.

15. Q. We don't often hear of big sums being given but by the Deputy Commissioner?—In the famine year lots of money was given to the zamindars, and they all worked very well. Not a single pice was misappropriated by the zamindars.

16. Q. Do the people complain at all of the terms or of the interest they have to pay?—They feel this difficulty that if they fail to pay once, there are some rules that the whole thing will be taken at once. Of this they are very much afraid.

17. Q. (Sir Thomas Higham.)—What rate of interest do they pay?—They are paying 6 per cent.

18. Q. (The President.)—When do they repay it; after how long?—They pay it back in five years; two or three instalments a year.

19. Q. Do you think that if, instead of five years, they were given 10 or 20 years, it would be better?—It would be very beneficial to the zamindars and to the whole district, and also for the Government.

20. Q. They never give it for more than five years now?—No. All the zamindars and even the *rayats* would take loans very gladly; only they are afraid that if they fail to pay on a fixed day, all the conditions will be imposed and all the remaining money will have to be paid back at once.

21. Q. Are there many wells in your district?—Yes. Our district is very rocky, so we cannot irrigate properly. There are lots of wells.

22. Q. Are the wells very expensive?—Not very expensive, but still the people have not any money to spend on well irrigation. Sugarcane we always irrigate from wells. If we can get irrigation from reservoirs (*bunds*) and we have any good ones, we must irrigate from them.

23. Q. In these bad years you have told us of were the wells dry, or did they hold water?—The wells were not dry; only the small reservoirs were dry.

24. Q. How deep have you to dig before you get down to water in the wells?—In lots of places after eight or ten feet you find water.

25. Q. Would they last right through a time of drought?—Yes, but they can only irrigate a small quantity of land.

26. Q. How much, 10 *bighas*?—Not so much. By *pains* we can irrigate 200 or 500 *bighas* as the case may be. If we get a good big reservoir, we can irrigate 500 *bighas* or even more from it.

27. Q. (Mr. Muir-Mackenzie.)—Have you yourself taken money from Government?—Only Rs. 2,000. The other people were afraid to take loans from Government, so I came forward and took Rs. 2,000.

28. Q. And you have spent this Rs. 2,000 in making improvements?—Yes.

29. Q. How much did you spend in making new *pains* altogether?—In six years I have spent more than Rs. 36,000.

30. Q. Has the result of that been to bring much more land under irrigation?—Yes.

31. Q. Can you say at all how many *bighas* you have brought under irrigation?—I think, so far as I can remember, I am now earning nearly Rs. 7,000, and hope to earn more when I can turn the land into paddy fields. I think, after spending Rs. 10,000 or Rs. 15,000, I shall make an income of not less than Rs. 10,000 or Rs. 20,000.

32. Q. You have already got an increase of Rs. 7,000 after spending about Rs. 36,000?—Yes, I shall earn more when I can turn the land into paddy fields. That takes a lot of time and expense.

33. Q. How long does it take to turn the land into a paddy field?—You can turn it into a paddy field in one year, or if the land is high, it takes two or three or five years.

34. Q. Has the Rs. 30,000 you say you have expended include what you spent on turning the land into paddy fields?—So far as I remember I only spent nearly Rs. 36,000 in six years.

35. Q. How much of that did you spend for *pains* and how much for converting the land into paddy fields?—I have spent nearly Rs. 4,000 or Rs. 5,000 in

turning the land into paddy fields, and the remainder on the bunds and channels. I have not prepared all my paddy fields as yet. The work is still going on.

36. Q. Were these channels you speak of for taking the water from the pains into the fields?—From the pains and from the rivers both.

37. Q. What sort of outlet do you have from your bunds?—I make some *pakka* bunds and also some *kachcha* bunds.

38. Q. For that you put in what sort of outlet?—I had to expend Rs. 10,000 in two years in making channels and making some *pakka* bunds.

39. Q. How do you let the water out of your *pakka* bunds?—By cutting a channel underneath it.

40. Q. You don't put a pipe under the bund?—No. It requires a little experience to see whether the water will come to a place or not.

41. Q. If you could get an overseer's or engineer's help, would it be an advantage?—Yes. I have made a *pakka* bund and cut a channel. I expended Rs. 12,000 on the work. I again undertook the work last year. Of course I took the level of the river in my land and then I cut a channel and took the water out very easily and have irrigated the whole of my paddy land, and it is now in very good condition. Palamau is a very backward district and very hilly, and unless we irrigate it can yield nothing.

42. Q. (Mr. Rajaratna Mudaliar.)—If you construct bunds, do you enhance the rents?—Up to this time I have not enhanced the rents, but when the rayats get some benefit I may enhance them.

43. Q. So you have power to enhance. You find no difficulty?—They are quite willing to do this. My rayats especially are quite willing and ready to enhance their rents if I can improve their lands. There will be no hitch so far as I know. The rayats are very much in need of irrigation, because, if you get good irrigation, your crops will not fail, and for the last six or seven years there have been always failures and they have been getting nothing.

44. Q. Have your rayats occupancy right?—In my *zamindari* there are no occupancy rights.

45. Q. Is there scope for constructing wells?—Yes. The poor rayats cannot construct wells at their own expense, but they used to excavate wells, especially the *coahars*.

46. Q. In such cases you don't enhance rents?—No.

47. Q. (Mr. Allen.)—You said you had got Rs. 7,000 profit. How did you get it?—By irrigation.

48. Q. How did you get it?—In my own cultivation. There are a few rayats there also. I think more than half is under my own cultivation and about half is under the rayats.

49. Q. What improvements in the yield of a *bigha* of ground do you think you can get from irrigation?—In good places, if the fields be manured properly, they would yield about 40 maunds *kachcha* per *bigha*.

50. Q. What is the yield from unirrigated land?—That is very uncertain. If the lands yield something, we get rent, and if they do not yield, then what can we get?—and if we do anything harshly, then the rayats will go away. In our district for the last six or seven years we are all suffering from want of rain.

51. Q. (Sir Thomas Higham.)—When you have made an *ahar* it silts up after a time?—Yes, after a long time, probably after 10 or 12 years as the case may be. There are many kinds of *ahars*—big *ahars* and small *ahars*; the condition of all *ahars* cannot be the same. That is why I say 'as the case may be.'

52. Q. What do you do when they silt up?—Do you clear them out again?—Yes. It will be very beneficial and you can get more water into them than before.

53. Q. After how many years?—10 or 20 years, as the case may be.

54. Q. Do you clear out two or three feet of silt?—Yes.

55. Q. Do the people clear the *ahars* themselves, or do you have to pay for it?—The rayats cannot pay; we do it ourselves. They are poor people and where can they get so much money?—They have always found difficulty in paying the rents during the last six or seven years of famine.

Raja
Bhagwat
Dayal
Singh.

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WITNESS No. 55.—MR. A. COOKE, Tea Planter, Ranchi.

1. Q. (The President.)—I understand that you are a tea planter?—Yes.

2. Q. In Ranchi?—Yes.

3. Q. Have you been long in that country?—Nearly 13 years.

4. Q. Were you here during the times of famine?—Yes, I was there in 1896 and 1899. There were two famines.

5. Q. Do the natives complain of the high prices there? The Deputy Commissioner told us the prices of food-stuffs were very high?—They are getting that way now.

6. Q. You say no land is irrigated after the rains cease?—Yes.

7. Q. And you say "all the present cultivation depends on the rainfall, and the rayats seem to think that it is useless to raise water and that actual water from the clouds is required." Do not the rains irrigate long after the rainy season?—Very little after the rainy season; practically nothing. The whole district has had no rain this last *habita*.

8. Q. It is an odd thing, is not it, that it is that water which is stored up that pulls them through?—No. It is owing to the failure of the rain that the water does not overflow and they never raise it.

9. Q. You say that irrigation is not wanted at all?—It is wanted to increase the area of the cultivated lands, but it does not protect against want of rain.

10. Q. You say "the whole country is undulating on the plateaus and thus offers an immense area to be improved by bunds, and I think that entire tracts of high and useless land might be watered from reservoirs on a higher level by means of pipes or aqueducts of any description which might be studied from Australian example." Do you know Australia?—No, but I have heard people who have come from Australia talking about it. I have had a man recently with me who has come from Australia and he is very strong on this point. The fields use about 1/4th of the rainfall; 3/4th flow away. If you make a channel and get it round one hill to another, the water could be led to places where it was not accessible before.

11. Q. You don't mean that water should be pumped up into a reservoir?—No, only the unrequired overflow.

12. Q. In reply to the question "Name the years in which reliable records show that there has been (1) famine and (2) severe scarcity not amounting to famine." You say "1896 and 1899," and you go on to say—"but I think that a large proportion of the crops could have been saved by raising water above the normal level of the outlets or by deepening the outlets, and thus irrigating some of the fields with the water stored in the reservoir." Was there not water in the reservoirs at the end of the rains that was not used?—Yes, the whole reservoir was full of water. There is a considerable lot of water which could be used if you could get it out by sluice gates, or pumping machinery of some sort.

13. Q. You mean it is below the level of the soil?—Yes, far and away below.

14. Q. You say in reply to question No. 9—"What general measures should be adopted for extending irrigation in the district by Government or private works?" "Ascertain the cost of bunds already established and the profits from them; this alone would attract capital into the district." You mean, I suppose, to publish them?—Yes.

15. Q. You go on to say, "I know of one spot where a valley sends its water through a narrow gorge, and could thus be made to irrigate a large tract in the lower valley at little cost, and there are thousands of such places in the district." I would rather not have Sonapat mentioned.*

16. Q. Has it ever been examined by Engineers?—No, never. In all these gorges there are hundreds of places like that where you get valleys opening into one another.

17. Q. You think, if you publish the results of works already established, you will attract capital into the country?—Yes. I believe in the country thoroughly myself.

18. Q. What is the Barkagarh estate you speak of in your memorandum. Is that a model farm?—No; I think it was taken over in the Mutiny. It is now a Government estate, worked by Government. It is about seven miles from Ranchi in a semi-circle.

19. Q. Then you say: "I recommend that trials should be made to put ammonia into water raised from reservoirs. This may be the reason why rain is necessary. Rain contains about one grain of ammonia to

Mr. A.
Cooke.

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* In addition to this, the railway runs all along the face of the hills, and so all now land opened up would be of extra value.

Mr. A.
Cooke.

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144 cubic inches of water; this would be supplied by a very small amount of artificial manure." Does the water that falls into those reservoirs drop all its ammonia?—After rain stops the water that continues to flow is drainage water and therefore partly filtered. The rayats tell me there is no use raising water. They say water must come up *ar se*. That is a mere suggestion of mine.

20. Q. Then you go on to say: "the most valuable concession would be to advance money on easy terms." Has the rayat got any difficulty in getting money in that way?—He cannot get money at all except through the *mahajan* at big interest.

21. Q. The Deputy Commissioner advances money to the rayats; does he not?—We have started now. He has given me the charge of a village bank with Rs. 300 to start with.

22. Q. Besides that, the Deputy Commissioner has in his hands a certain amount of Government money to make advances to the district in general?—If you advance to one man, then there is always the difficulty to get it back on his own individual security. The new principle is to advance to the village as a whole. They advanced a lot of money to the rayats in 1897, and they are still trying to recover that money now.

23. Q. (Mr. Muir-Mackenzie.)—About this statement that there is no land irrigated after the rain ceases, do you mean that if there is an area which is filled during the monsoon, and there is a break for some time, that no water can be got from the *ahar* to irrigate the rice fields during the break?—No. As soon as it is filled it overflows, and it stops overflowing as soon as the rain ceases.

24. Q. So that the only benefit of the rain is that rather more water is got than the rain gives which falls on the lands?—The benefit derived is that it extends the area of cultivation; you get in more fields.

25. Q. I don't quite understand that?—For instance, if there is a small valley and a little embankment across the bottom of it and from that the water comes down both edges, then you get in all the other sides of the slope. This one bund I am speaking of in Rampur will irrigate about 200 acres of land eventually when the fields are level.

26. Q. Even in a drought after the rain stops?—No. All that is dependent on the rainfall absolutely.

27. Q. Have you ever heard of any zamindars who have received advances to make bunds having made considerable profits by it?—No.

In my evidence on 3rd November at Purulia I stated that the stored water, in the reservoirs formed by embankments, is not used by the rayats after the rains cease. On the next day I saw the Hazaribagh Local Board District Engineer. He told me that, after the rains cease, the rayats raise the stored water and thus continue to irrigate their crops.

It is possible that there is more need for irrigation in Hazaribagh than in Ranchi, but from observation in my neighbourhood and enquiries from the natives I am sure that the practice of throwing up water has not yet been adopted in the Ranchi District.

I wish to point out that, although my evidence in this matter may be doubted, as being controverted by the evidence of the Hazaribagh District Engineer, it will prove on further enquiry to be true.

In Hazaribagh the rayats do raise the water. In Ranchi the rayats do not raise the water. I will suggest to the Deputy Commissioner of Ranchi that a few Hazaribagh rayats shall be engaged in the Barkagari estate to show our people how it is done, and to prove to them the possibility of saving a part of the crop in bad seasons.

The increase of the area of cultivation and the saving of a part of the crops when rain falls has very little bearing in the matter of preventing famine compared with the possibilities of enabling the rayats to keep what they get in years of plenty.

To put only one instance before you.

Rents are due in October and January.

Rayats sell their rice to pay their rents.

In October 1902 in Ranchi the price of rice was 13 seers per rupee.

In December rice will sell for 16 seers per rupee. The rayats will pay their October *kists* at the ratio of 13 seers and their January *kists* at the ratio of 10 seers.

In the following August (1903) the price of rice will be 8 seers per rupee, but the rayats will have none left to sell, and in many cases will have sold their seed rice to pay their rents.

The rayats has sacrificed 13 seers of rice in October and 16 seers in January for every rupee of his rent.

28. Q. We had considerable evidence on the subject this morning from the Deputy Commissioner of Palamau. You were not here then?—No.

29. Q. The Raja of Chainpur also spoke of it. And Mr. Lyall told us of one estate in which they had advanced Rs. 11,000 for improvements and were enabled to double their rents. You have never heard of any instances of that kind?—No particular instances.

30. Q. You think if the zamindars will make bunds they will get considerable profits?—Yes.

31. Q. You don't think there is anything unjust in their raising their rents?—No. They make waste lands into valuable lands. I have never made bunds myself.

32. Q. The village bank is an agency by which you advance money to the rayat and not to the zamindars?—Yes, to the rayat direct.

33. Q. Are not the rayats of the district tenants-at-will?—I know nothing about their tenancy.

34. Q. Is there not the danger of a rayat being ousted at the will of the zamindar?—I don't know that; still that does not affect the security of the bank.

35. Q. Has your bank advanced any money for agricultural improvements?—Rs. 300 once and Rs. 200.

36. Q. What sort of improvements?—The Rs. 300 was given without any conditions; that merely told us it was for cattle, but the other was advanced only for making fields, and I saw they did so.

37. Q. You don't think the rate of interest at which money is given at present—one anna on the rupee—too heavy, do you?—No, I think it is right. But it is two annas on the rupee is it not?—The Government advance to us at one anna on the rupee, and we take two annas on the rupee. The surplus will repay the fund eventually.

38. Q. What does the *mahajan* charge?—That I don't know. I really could not say anything about that.

39. Q. Does the country about Ranchi differ very much in configuration from the country in Palamau?—I have not seen Palamau. The whole of Ranchi is a plateau. It is all undulating ground.

40. Q. Are there a good number of streams?—Very few streams. There are only two rivers and some nullahs, which are only channels for the flood water.

If he could have borrowed the amount of his rent in cash and put away his rice, he would be able in August to sell his rice at 8 seers per rupee, repay the loan and interest, and would have a balance of rice for his own use.

He would have saved 5 seers per rupee in October and 8 seers per rupee in January.

This would surely have a better effect than any amount of irrigation.

The saving of money would imply more perfect irrigation.

It is money at low interest that is wanted and not more water.

Below I give an instance which may illustrate the effect of advancing cash to the rayats and taking over their grain in trust.

Instance of a man who pays Rs. 54 rent.

	Rs.	A.	P.
Due in October	57	0	0
" " January	27	0	0
Advanced on loans	54	0	0
Interest on Rs. 54 @ 6½ per cent.	3	8	1
Required from the borrower	57	8	1

Without a loan he will have to sell—
In October @ 13 seers Rs. 27
In January @ 16 " Rs. 27

Total	783
To keep this till August means a loss of 20 per cent. of 783	156
Balance left	627
To pay Rs. 57-8-1 @ 8 seers of rice per rupee	480
Saved	147

This would either be kept for food and sowing or sold at 8 seers, and thus secure another Rs. 20-14-0 which is nearly enough to pay the following October *kist* without borrowing.

Is it possible to turn grain banks, raising grain, as deposit in trust, and advancing cash at moderate interest?

WITNESS No. 56.—MR. WOODHAR CHANDRA ROY, Ranchi.

Replies to printed questions.

1. Q. (The President.)—You are from Ranchi?—Yes.

2. Q. Are you a zamindar there?—Yes, I have some petty zamindaris there—a few villages.

3. Q. Are you in Government employ too?—No. I am an Honorary Magistrate.

4. Q. You say here in reply to question No. 10—, "Bunds are generally constructed by throwing embankments across hill streams or large drainage areas. The existing bunds have been mostly constructed by zamindars and they have the entire control over it. The state of repair is very miserable, because most of the zamindars are not well off and cannot afford to keep the bunds in proper repair; and for this account they fail to supply needful quantity of water in the years of drought. The chief obstacle in the way of extension of bunds is the poverty of the zamindars, and so long as the existing law continues, the rayats have very little inducement to invest any money in embankments even if they have money and inclination to do it, as under the Chota Nagpur Land Law the rayats never acquire saleable or transferable rights to the land. I may add that, if this obstacle is removed, the rayats of themselves will take to constructing bunds and provide other means of irrigation in years of drought at their own cost. They will in that case always try to effect material improvements in what may then be properly called their own lands." You say the zamindars are too poor to keep the bunds in order?—Yes.

5. Q. Why don't they borrow money from the Government?—Well, if a zamindar dies heirless, his estate goes free of encumbrance to the Chota Nagpur Maharaja, so that these zamindars, who see that they have no successors, do not take any interest in their estates. It is a strange sort of law here.

6. Q. But it would be profitable for the zamindar to have his bund in good order, would it not? He would get more revenue out of it?—Yes, for the time being it would be profitable; but unless his estate is saleable or transferable, I think there is no inducement for him to do this kind of work.

7. Q. Then the zamindar's property is not transferable here?—Not transferable, nor saleable, without the liability of resumption by the Maharaja on failure of male heirs.

8. Q. Have you got any wells in Ranchi?—Yes, we have.

9. Q. Are they used for irrigation?—In vegetable gardens. They also irrigate sugarcane.

10. Q. There is no cultivation of sugarcane in Ranchi?—In Bondoo there is sugarcane cultivation. There is a large embankment there called the Bondoo bund. The bund belongs to me. I have stored a large quantity of water there, and more than four miles in length is sometimes irrigated in a year of drought. It is the very biggest bund in Chota Nagpur. I think Mr. B. C. Boso has dealt with it very largely.

11. Q. How high is the bund?—It is not very high, about 10 or 12 feet high, but it is very long and wide.

12. Q. Do the people wish for irrigation in Ranchi? Do they wish to have things better than they are there?—To make irrigation work at Ranchi is very feasible and less costly.

13. Q. You mean by making ahars?—I think by dividing the spring of the hill streams you can make more cultivated lands and can easily irrigate. I have got a rough sketch here (explains what should be done on map). This is the hill and these are all streams. The water falls in this way, but this portion of the land has an inclination to fall this way.

14. Q. When does that stream (indicates it) get dry? About the 1st of November?—Sometimes before that. If we can raise bunds here (indicates it), we can get the water there all the year round.

15. Q. Do you think the people would use water every year for irrigation?—Yes, sometimes in years of drought.

16. Q. Not every year?—Every year it is not necessary.

17. Q. Would they pay for the water?—Yes, for the Bondoo bund they do pay.

18. Q. Supposing we make new irrigation works, would the people be willing to pay for them?—Yes. Mr. W. C. Roy.

19. Q. Would they pay as much as they do on the Sone canals?—I don't know the rate there. 8 Nov. 02.

20. Q. Rs. 2-4 or Rs. 2-8 an acre?—No; I think they will be willing to pay Rs. 1-8 per acre.

21. Q. But they wish to have irrigation?—Yes. Large irrigation works are impracticable in Chota Nagpur, because of the country being undulating and of the lands being scattered here and there; they are not in one place.

22. Q. (Sir Thomas Higham.)—You told us nothing about the way in which these ahars silt up. You say that most of them are in miserable repair. What is the matter with them?—The silt is not cleared.

23. Q. The silt has accumulated in them so that they won't hold water?—Yes.

24. Q. What do you do for that?—The silt has to be removed.

25. Q. Is it worth while removing the silt?—Yes. The silt can be used as manure.

26. Q. How far do they carry it to use it as manure?—These people only use a country cart and carry it a mile off.

27. Q. They have to pay men to take it away?—Certainly not. I don't charge them anything for it.

28. Q. You let the men come and take it away?—Yes.

29. Q. You don't pay them anything for taking it away?—No.

30. Q. Why don't the rayats do that?—I have already said that the rayats have very little attachment to the land. They know that, by making improvements, they will not benefit at all.

31. Q. How long does an ahar go before it wants cleaning out?—It should be cleaned every fifth year.

32. Q. Is there much stuff in it then?—Every year more than a foot of silt is deposited in it. The water falls in a high current and brings up the earth from above and deposits it there.

33. Q. After five years what is the deposit?—It is not entirely filled with silt, because the silt is also taken away by the current that passes over the ahar or bund.

34. Q. Do the bunds ever burst?—Sometimes.

35. Q. When an ahar has silted up, so that it won't hold enough water, instead of digging it out, do they ever raise a bund?—Sometimes. I do this and have done it. In 1897 I got some money from Government and cleared up the silt and raised an embankment.

36. Q. Is the practice of taking silt for manure largely followed?—I have been inducing them to do this and been trying to prove its value. I have succeeded in proving it a nice manure and they have commenced using it.

37. Q. You don't pay them anything for taking it away?—No.

38. Q. (Mr. Muir-Mackenzie.)—This year you made one big bund yourself?—I purchased that bund in auction.

39. Q. Have you made any improvements to it?—Yes; in 1897 I made some improvements to it.

40. Q. How much did you spend on it?—I spent Rs. 1,000. I spent about Rs. 500 only to raise an embankment.

41. Q. That got more water into it?—Yes.

42. Q. Did it not result in an increase of cultivation? Did you get more land under cultivation?—No.

43. Q. You only got better water?—Yes.

44. Q. Were you able to increase your rents at all?—No. I won't be able to do that, because the rayats have their permanent occupancy rights.

45. Q. Have your rayats got an occupancy right?—Yes.

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46. Q. Are not most of the tenants in your district tenants-at-will?—The Maharaja's tenants don't get any occupancy rights—I mean saleable occupancy right.

47. Q. But your tenants do?—Yes, with my sanction which I generally give. In Chota Nagpur occupancy right is permanent, but not saleable or transferable. I was for some time a manager of Tori Pergunnah, and from that and from consulting all the rayats I have learnt that it is only because they have not got the right of selling or transferring their property that makes them so indifferent.

48. Q. (Mr. Rajaratna Mudaliar.)—Cannot the tenants adopt on failure of heirs? Cannot a rayat adopt a male heir?—It is not always admissible. Besides the rayats are so illiterate that they have no idea of this thing at all.

49. Q. Under the present custom or law are they prohibited from adopting in case of failure of heirs?—I don't know much about it. I know that a Sub-Judge, Babu Amrita Lal Pal, held in a case that adopted sons are as good as the other sons, but the case was not decided. It was compromised by the Maharaja. It was rather about to go against the Maharaja and so it was compromised.

50. Q. Is there a masonry sluice in your bund for letting out the water?—Yes. I made a dam and I keep that with trap closed and open it in time of need.

51. Q. The whole of the water is utilised for irrigation?—The whole amount was never required; half is quite sufficient.

52. Q. But you can pass it on?—It goes down four miles only, and irrigates the lands on either side of it. The Bondoo is very fertile land.

53. Q. What area is irrigated; how many bighas?—500 bighas.

54. Q. Your bigha is how many acres?—It is one-third of an acre.

55. Q. (The President.)—That is a *kachcha* bigha?—Three bighas make an acre.

56. Q. (Mr. Rajaratna Mudaliar.)—Is there any more land available for irrigation under your bund?—No.

57. Q. (Mr. Allen.)—Do the rayats who hold land under the Bondoo bund pay higher rents?—They have got their fixed rent which is never increased.

58. Q. Why do you say the Maharaja's tenants cannot get occupancy rights?—Occupancy rights they can get, but they cannot transfer it.

59. Q. (Mr. Muir-Mackenzie.)—You said you were manager of an estate?—I was manager of some of the Maharaja's brother's estates, the Maharaj Kumar's estates.

60. Q. Were there any bunds there?—I commenced making several bunds, but there was some misunderstanding between me and the Maharaj Kumar, and so I had to give up his service before I could complete those bunds.

61. Q. Did the work you did there result in bringing in any more lands under irrigation?—Yes.

62. Q. And did you get any better rents from those lands?—I turned some fallow land into cultivable land.

63. Q. Do you know at all how many bighas?—I don't remember.

64. Q. You don't know how much the zamindar gained?—My rough idea is that I expended Rs. 500 or thereabouts, and the annual income was more than one hundred in the next year.

65. Q. From the new lands being brought under cultivation?—Yes.

EIGHTH DAY.

Parulia, 4th November 1902.

Babu Gopal
Chunder
Sen.
3 Nov. 02.

WITNESS No. 57.—BABU GOPAL CHUNDER SEN, Manager of the Palganj Estate in Hazaribagh District.

1. Q. (The President.)—Is there much demand for irrigation in this part of the country?—Yes, throughout the country.

2. Q. How is that want best to be met? What ought the Government to do?—Make *ahars* or bunds. There are a great many old ones and about 90 per cent. of them have been silted up.

3. Q. Do the zamindars or rayats make them for themselves?—They are very poor. The custom is that zamindars generally give away villages in *tika* for a five years' lease, and after the expiry of that period the mouza or village can be settled on anybody else. On that account the *tikadars* do not care to make any improvements. In our estate we give *tika* for 20, 25 or 30 years, but even then the *tikadars* do not make improvements. Those who are not poor—only two or three estates—do not care for it.

4. Q. Could more poor men not get loans from Government to make their *ahars*?—They do not like the idea of taking loans. A certain percentage of them is taken by the *amlas*, and the rules for recovery are very strict.

5. Q. In how many years is the sum to be paid back?—Five.

6. Q. If it was twenty instead of five, would they take loans?—Zamindars are always fond of taking loans, but they do not always use them for the improvement of their villages. They are not intelligent and not at all educated.

7. Q. Would they not get better rents?—If they make the bunds, then of course they are supposed to get better rents, but I do not think half the amount would be spent on making bunds if there is not some Government control over their action.

8. Q. There might be such control?—Yes, the rayats would be very glad to have the bunds and the zamindars also. But I do not think the zamindars would be able to make *ahars* without supervision and Government control.

9. Q. Why not? The old *ahars* must have been made by themselves?—Their forefathers.

10. Q. And they are not so good as their forefathers?—No. They are deeply involved in debt and the estates have been divided up.

11. Q. Have you any wells in Hazaribagh?—Yes.

12. Q. Are they used for irrigation?—Only for certain crops—sugarcane, potatoes and garden produce.

13. Q. Rabi?—No, except in the thana of Gawan.

14. Q. I suppose the greater part of the cultivation is rice?—Yes.

15. Q. You think all that is wanted is to put these *ahars* or bunds in order?—Yes, there will then be no failure of crops, and besides that, a lot of land will be reclaimed.

16. Q. If the people made these *ahars* themselves, would they not do it cheaper than the Government?—Yes.

17. Q. Why should not the rayats with occupancy rights borrow from Government?—Because their land is not saleable. They are very poor and their holdings are not certain, because the zamindars and *tikadars* snatch away the land from them at any moment; the zamindars would enhance their land. Those who have occupancy rights will continue to hold their land as long as they like, but the practice is that the zamindars take away the lands. The rayats are regarded more as tenants-at-will.

18. Q. (Sir Thomas Higham.)—What is the area of your estate?—267 square miles.

19. Q. Why do not you put the *ahars* in good order?—For want of money.

20. Q.—Can you not afford to do anything?—No, the estate is involved.

21. Q. (Mr. Muir-Mackenzie.)—You say, if these *ahars* are put into repair, there will be no failure of crops. But will they hold water in a failure year?—Yes, because in the Hazaribagh District, I have watched it for 35 years; the rainfall varies from 40 to 55 inches a year, even in famine years, and it is only when the fall is not well distributed that there is failure of crops.

22. Q. If you have no good rain in September?—It will be no harm if we have *ahars*.
23. Q. Will the *ahars* still hold water if there has been little or no rain in August?—Yes.
24. Q. Did you never make any improvement when you were manager of the encumbered estates?—As far as I could. The object of the Act is to pay off debt, and only what can be spared from the payment of debts we spend on improvements.
25. Q. Did you make *bunds*?—Yes.
26. Q. Did you get more rent on that account?—Of course we raised the rents and got new land under cultivation.
27. Q. Did you spend as much as a thousand rupees on one *bund*?—I spent about Rs. 1,000 in one year when the rental was Rs. 1,35,000.
28. Q. Did you ever ask to be allowed to spend a little more money on improvements?—Yes, and the Board was always ready to sanction that amount after the payment of debts.

29. Q. (Mr. Allen.)—In how many years were the debts of an encumbered estate to be paid off?—Fifteen years. Formerly it was 25, but the Act was amended in 1884.
30. Q. You were in charge of all the estates administered under this Act in the Hazaribagh District?—Yes.
31. Q. What area was under your administration there?—About 2,000 square miles. The area of the district is about 7,000.
32. Q. Would it be a good thing if more money were spent on improvements in encumbered estates?—Yes.
33. Q. Why?—Because if, after the payment of debts, the estate is kept under management for some years to make these improvements, it would be most beneficial.
34. Q. Does the zamindar gain by making improvements?—Yes.
35. Q. In what way?—By increasing the rent and by reclaiming lands.
36. Q. For how many years did you administer these estates?—Five. From 1892 to 1896.
37. Q. What did you spend on an average in a year on improvements?—Very little; not more than Rs. 1,000.

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WITNESS No. 58.—MR. A. H. GANTZER, District Engineer of Hazaribagh.

1. Q. (The President.)—You have been 27 years District Engineer?—Yes.
2. Q. Have you ever seen severe famine there?—In 1873-74 there was famine there.
3. Q. People dying from want?—No.
4. Q. Had you relief works on a large scale?—We constructed a road, 32 miles from Bagodar to Hazaribagh, with eight bridges and 82 culverts.
5. Q. You have had no relief works since then?—No, not on such a large scale.
6. Q. Have you had anything to do with the irrigation of the place?—Yes, all the Government estate *bunds* and the encumbered estate *bunds* and those of the Court of Wards are under me.
7. Q. I suppose you see that they are in good repair?—As far as funds are available.
8. Q. Is there difficulty in getting money?—Yes, especially in encumbered estates. At the utmost we get Rs. 1,000 a year. There was only one estate under the Court of Wards (Dhunwar estate) and we made several improvements in that.
9. Q. What is your experience of *bunds* in zamindari land?—They are in very bad repair; most of them silted and breached. To my certain knowledge extending over 33 years, I did not see that any work has been done in these *bunds* by zamindars.
10. Q. Do you put that down to the poverty or the stupidity of the zamindars?—The poverty of many. The larger zamindars do nothing. In some part the *rayats* would gladly pay enhanced rents, because they are so badly off for water.
11. Q. What should be done?—All the *ahars* should be cleaned out.
12. Q. How much silt lies in them?—In one place I have seen ten feet, and other places, five, six and seven in the basin of the *bund*.
13. Q. Is the silt any use?—They never touch it; it is mostly sand—the washings from the upper lands. They should have a little dyke to keep the soil from washing into them.
14. Q. Would it be necessary to put up *bunds* in other places?—First those in existence should be repaired.
15. Q. Would not that be enormously expensive?—Not more than Rs. 150 to Rs. 300 each.
16. Q. Why do not people take advances from Government?—They are willing to take advances, but they do not know how to manage their affairs. If they took advances and the thing was managed under Government control or that of the District Board, the *bunds* could be made. They would pay an interest of even two pice in the rupee per annum and pay back in five years.
17. Q. Does the Deputy Collector refuse to grant them the money?—Most refuse to take, because they do not get the full amount of the money advanced. Some get about 12 annas in the rupee. It stops in the hands of the *mohurrirs*. If these advances were made through Deputy Collectors personally, they would get the whole amount.

18. Q. They do not want more than five years?—No. The last time they had to pay within two years, I believe.
19. Q. If the Deputy Collector went out with a bag of rupees and enquired, would a good number take advances from him?—Yes, if he went in time. The last time they went out rather late when the seed had been sown. But the work in their (people's) hands would not be done properly. The District Board can help in that as in 1897. We had their help in measuring up the works.
20. Q. In 1897 there was distress here, but not famine?—Yes.
21. Q. You say the failure of crops in Hazaribagh is by no means the result of scanty rainfall, but due to untimely and irregular rainfall?—Yes. They find difficulty just before reaping—the *kathia* period.
22. Q. If they had these *ahars*, they would have water?—Yes.
23. Q. You say "a *bund* once silted or breached is seldom or never repaired, because the *rayat* looks to his landowner for the necessary repairs, but the landlord in most cases is hopelessly involved in debt." And the landlords ought to be compelled to keep them in repair?—Yes. Because they do not know their interest. If a little water cess were imposed on them, it would be better; any, a pice in the rupee. They would be very glad if they had water, because it would help them, whereas the *rayat* cess they do not care about. But they take a personal interest in this matter.
24. Q. With this water cess would the District Board carry out the works?—Yes. Without supervision it is a waste of money. The work actually done should be measured in every case.
25. Q. You say "loans under the Lands Improvement Loans Act are not taken freely by the people for the extension of irrigation, or reservoirs, owing to the difficulty experienced by cultivators, in obtaining them," and you mention the appropriate measures usually adopted in realising them. Yes. You suggest for the encouragement of these loans (1) "the partial remission of advance." What is that—not to take the whole back?—Last time they allowed them a remission of one-third when they did the full work.
26. Q. And (2) "total remission in bad years." You do not mean merely postponement and (3) "the extension of the periods of repayment"?—Two years was very short. They want five years.
27. Q. Lastly "grants-in-aid"?—And if advances were given to the *rayats* clubbed together, a dozen respectable men of each village, they would be more easily realised, because each would be held responsible.
28. Q. (Sir Thomas Hingham.)—You were in this district in 1897 and 1899?—Yes.
29. Q. Did they have much famine in 1897?—In only one corner of Goomean thana.
30. Q. The rainfall was not short?—No, but not properly distributed.
31. Q. You did not do any village works?—No, except repairing *ahars* in Government, encumbered and Court of

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Gantzer.

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Wards estates. They like that work better than roads, because the soil of the latter is very hard.

32. Q. How many people did they have on road works?—Not more than 2,100 a day.

33. Q. You had famine in 1899?—No.

34. Q. Short rainfall?—Yes. But we had hardly any relief works.

35. Q. What were they?—Mostly *ahars* in the Government, encumbered and Court of Wards estates.

36. Q. You never put relief labour on zamindari estates?—In 1899 we got Rs. 1,000 from the Raja of Padma and I re-excavated nine of his *ahars*.

37. Q. The labour comes from the zamindari estates for the relief works. When a tank is once silted up, no one will ever clean it again. Is it worth while?—Yes, they would hold a lot of water.

38. Q. How much water do you want to flood an acre of land with three inches of water?—About 11,000 cubic feet. Then there is the earthwork to clear.

39. Q. How much would it cost you to clear that earthwork?—We calculate Rs. 2 a thousand.

40. Q. To clear enough silt to bring out one fath for an acre you would have to spend Rs. 23?—Not more than Rs. 15 an acre to remove silt 3" deep.

41. Q. That is a great deal to pay for every acre. I quite understand they don't care to borrow money to clear their tanks if it costs as much as that?—If they got money at 2 pice in the rupee, it would not cost so much. They would gladly pay that.

42. Q. People never take the silt out for the purpose of manuring their fields?—No, but you can improve the bank with it.

43. Q. Did you clear out a lot of these *ahars* in 1899?—Not many. We got from the Court of Wards Rs. 5,000 and from the encumbered estates Rs. 1,000 and from Government estates Rs. 1,500 or Rs. 2,000.

44. Q. (Mr. Muir-Mackenzie).—Did you use all that money in clearing out silt?—In deepening the basins.

45. Q. You did not use it in raising the embankments? In re-sectioning them and raising them in some places where there were breaches.

46. Q. You did not increase the height?—No. They could not afford to do that.

47. Q. Would not that have been an effective way of getting more water into the *ahars*?—The *ahars* would hold more water by deepening the basins.

48. Q. If you have a failure of rain in September and October, will your *ahars* hold any water in October when all the water has been taken out for the September waterings?—They hardly water in September. All they require is to water in October during the *hathia* period.

49. Q. Not even if the rains fail?—No.

50. Q. Therefore, if you have good rain in August, you will have plenty of water in the *ahars* in October?—Yes. If for fifteen days they get water at the beginning of the second week in October, the crops will not fail.

51. Q. On the Government estates you made some *ahars*. Has not more rent resulted from that?—Until a re-settlement is made they are not going to take any more rent.

52. Q. No new lands brought under cultivation?—Not yet, but at the next settlement. It is now let to *tikadars* and they will not make new lands nor allow the *rayats* to do it. All the estates are now being re-settled on the *rayatwari* system.

53. Q. (Mr. Allen).—When you spoke of the repayments of *takavi* loans within five years, were you speaking of the repayment by instalments or the entire loan?—The entire loan by five instalments.

54. Q. You think it would be a good thing if the period for repayment of the entire loan were postponed for 20 years?—Certainly.

55. Q. (The President).—With all your experience of this country have you ever seen any places where you thought a very large reservoir might be made?—I do not think that would do, because the land is so undulating.

56. Q. A point about 80 or 100 feet high?—No, if all the little *ahars* are maintained, there will be plenty of water.

WITNESS No. 59.—MR. F. A. SLACKE, Officiating Commissioner of Chota Nagpur.

Mr. F. A.
Slacke.

3 Nov. 03

No. 192 MR, dated Ranchi, the 5th May 1902.

From—F. A. SLACKE, Esq., I.C.S., Offg. Commissioner of the Chota Nagpur Division,

To—The Secretary to the Government of Bengal, Irrigation Department.

I have the honour to reply as follows to Government order No. 1457-I, dated the 10th of December last, forwarding a set of questions framed by the Indian Irrigation Commission regarding the administration of water-supply.

2. The following officers were called on by my predecessor, Mr. Forbes, to submit replies to the questions framed by the Commission, viz. :—

The Deputy Commissioner of Singhbhum;
" District Engineer of Ranchi;
" " " of Palamanu;
" " " of Manbhum, and
" " " of Hazaribagh.

3. On going through the file, I found that the District Engineer of Ranchi had expressed his inability to give any information on personal knowledge, and that in the case of Manbhum, the District Engineer being absent on leave, the replies had been submitted by the Overseer in charge.

4. I therefore called on the Manager, Encumbered Estate, Ranchi, for replies to the questions, as regards that district, and the District Engineer of Manbhum having returned, I desired him to make such notes as he thought fit on the answers given by his *locum tenens*.

5. Their replies having been received, I now submit, in original, the answers given by—

(i) The Deputy Commissioner of Singhbhum;
(ii) The District Engineer of Palamanu;
(iii) The District Engineer of Hazaribagh;
(iv) The Officiating District Engineer of Manbhum, with District Engineer's comments thereon; and
(v) The Manager, Encumbered Estate, Ranchi, and would request that when these are printed, five spare copies of each may be sent me.

6. The safety of the crops in this division in years of scanty or irregular rainfall depends on the state of the *ahars*, of which the number is at present much below what it might be. How to increase the number of *ahars* and to maintain them in efficient repair are rather difficult questions.

The following matters are involved :—

- (i) Nature of tenancy;
- (ii) Provision of capital;
- (iii) Liability to increase of rent;
- (iv) Provision of the land required; and
- (v) System of maintenance.

7. With regard to the nature of the tenancy, the existing doubts will, in the course of the next few years, be removed, as the survey and record-of-rights is completed.

8. As to capital, the subject admits of sub-division according as the aid is required by (a) tenants or (b) zamindars. So long as the tenants have to come into the head station for the money required, and the present system of using peons for realising the arrears is maintained, the repugnance to have recourse to Government for aid will not be lessened.

I would make it the ordinary rule that advances should be given out locally by an officer not below the grade of a Sub-Deputy Collector, and I would employ a similar officer to effect the realisations himself. The expense, looked at merely as a loan business, would be high. But such expenditure is trifling compared with what is spent often for no real lasting good to a district in famine times, for the prevention of which these *ahars* would be of much assistance; and with regard to the zamindars, the bulk of them in this division are spendthrifts. The few who can manage their estates will always, like the zamindar of Oontari, in Palamanu, be keenly alive to the pecuniary advantages derivable from such works, and will need neither aid nor outside pressure. The others neither have the means nor the inclination to undertake such schemes, and they are not.

prepared to borrow the requisite funds from Government, as they are aware that the results, owing to want of any effective supervision, would probably be grossly incommensurate with the sums expended.

I am, therefore, of opinion that any real increase in the number of the *ahars* must be looked for from the tenantry.

9. In all probability there will be many cases in which a tenant, desirous of making an *ahar*, cannot do so, as some land necessary for the scheme is not in his possession.

It will, therefore, be very necessary to devise some easy method for meeting a difficulty of this kind, otherwise the *salami*, which will undoubtedly be demanded, may often prove prohibitive.

10. The two questions about the liability to increase of rent and the system of maintenance seem to me to hang together. It is plain that the tenant must always have an incentive to induce him to keep the *bund*, which forms the *ahars*, in order, and to periodically remove the silt from the *ahars*. The landlords could not maintain these *ahars* themselves in order. They would not afford the necessary staff nor would they cope with what can only be described as the wanton thoughtlessness of the villagers who will often, for the sake of catching a few fish, cut a zamindari *bund* across the middle and repair it badly. The result is that next season or so the *bund* bursts.

For this end, I would suggest that after the expiry of the period for which the land improved may be held subject to no additional rent (by way of compensation for the cost incurred in putting up the *bund*), the tenant may be called on to pay an increased rent: the new rental, however, not to exceed what the rental of the land would be at the rate next but one below those prevailing for lands of the same quality in the village.

In this way, if the improved lands were first-class in quality, the tenant could never be called on to pay more than second-class rates for them, and the difference would compensate him for the cost of repairs and induce him not to let the *bund* get out of repair. I would allow this privilege to a tenant who was not the successor in interest of the maker of the *ahar*, otherwise it would fall into disrepair like so many of such works already have.

11. There remains, however, another class of works which would be very useful, *viz.*, *bunds* across streams whereby water is diverted by a *gala* to a series of *ahars*. In seasons of scanty rainfall, these are most useful, but their number, I understand, is not many. Owing to the want of any general power of combination amongst the tenantry, works of this nature are beyond their means, and but few zamindars are wise enough to undertake such schemes.

Ordinarily speaking, about 45 of these districts are being managed by Government, either as *khas* *muhals* or under the Wards Act or the Encumbered Estates Act. I think myself that more might be done by Government in such estates than has hitherto been the case to introduce such sources of supply, and I am about to address the Board of Revenue on the subject.

I

No. 810-R., dated the 5th January 1902.

From—W. B. THOMSON, Esq., I.C.S., Deputy Commissioner of Singhbhum,

To—The Commissioner of the Chota Nagpur Division.

With reference to your No. 749M.R., of the 14th December 1901, I have the honour to submit the following replies to the enclosed questions set by the Irrigation Committee:—

A.—GENERAL.

1. The whole of Singhbhum, of which I have been Deputy Commissioner since 2nd April 1898—

	Inches.	
2. January	1.00	Average of last three years.
February	1.33	
March	0.39	
April	0.81	
May	3.82	Normal, as per meteorological report.
June	8.53	
July	13.43	
August	13.04	
September	8.05	Average of last three years.
October	3.72	
November	0.27	
December	0.16	

Ben.

3. (1) No.

(2) No.

(3) No.

(4) No.

(5) No.

(6) Yes; from lack of capital for initial expenditure. The district consists of three large estates. The owners of two of these, Porabat and Dhalbhum, are unenterprising. The third is the Government Kolhan Estate for improvement in which Government allots about Rs. 10,000 annually, out of which about one-third to one-half is annually spent in making *bunds* for irrigation. The rayats are improvident and poor cultivators, and consequently have neither funds nor any strong desire to make improvements in irrigation themselves.

(7) No.

(8) No.

(9) Yes; from the undulating configuration of the country, *bunds* and tanks are the only practicable form of irrigation.

4. No such assessment is made at all during the currency of the tenants' settlement. On its expiration, the land irrigated is assessed according to its class. The same applies to enhancement of rents of rayats who have extended irrigation (which here is done only by the construction of *bunds*) at their own cost.

I consider this is sufficiently liberal.

5. No. Because the people are both bad cultivators and lacking in enterprise.

(1) No.

(2) No.

(3) No.

(4) No. Advances should not be made for works of doubtful utility.

(5) Yes.

(6) Yes.

6. No. Except among the rayats of the Kolhan Government Estate, in which Government annually makes a number of *bunds*. This desire is, however, an expression of a wish to have a good thing which costs them nothing. They would not keep the *bunds* in proper repair after Government has made them.

Why should they when the well-being of these *bunds* is a ground for increasing their rent?

F. A. SLACKS, - 25-2-1902.

B.—CANALS OF CONTINUOUS FLOW.

There are none such.

C.—CANALS OF INTERMITTENT FLOW.

None such.

D.—TANKS.

Under this head I include also *bunds*.

23. (1) These are constructed so as to catch the rainfall draining off a considerable area of high lands. In some cases they also contain springs, but the drainage forms the chief source of supply.

(2) In tanks a cut is made in the embankment when water is wanted. In *bunds* overflow cuttings are made at the ends of the embankment through which surplus rainfall escapes, and is distributed over the area to be irrigated. Should the rainfall fail, the embankment itself is cut. In this case the area irrigated is comparatively small.

(3) (a) From beginning to end of rains.

(b) and (c) In these cases the tank or *bund* acts as economiser of the rainfall. It collects the surplus rain on the occasion of each fall of rain, and permits it to be utilised between the different showers.

(4) About 150 to 200 acres.

24. (1) The rayats are too bad cultivators to avail themselves to any great extent of *bunds* and tanks for this purpose. They are, however, beginning to do so by growing wheat, *tisi*, and some other crops on lands from which they have already taken a paddy crop.

Mr. F. A. Slacks.

3 Nov. 02.

Mr. F. A. Slacks. (2) Practically not at all, except where the irrigation permits upland unembanked lands growing *rabi* and other such crops to be turned rice-producing embanked lands.

3 Nov. 02. (3) In the lowest lands a full or nearly full crop may be obtained; in the higher irrigated lands a part of the normal crop may be obtained. *Bunds* in this case are not a complete protection against failure.

25. (1) The *bunds* and tanks are not full enough to afford means of irrigation until after the first few showers. Should these be insufficient to fill the tanks and *bunds* before they are needed for irrigation, the value of the tanks and *bunds* for irrigation is very little. Should they fill the tanks and *bunds*, the value of the latter for irrigation is not affected.

(2) Very considerably. Water is most needed when the paddy is forming in the year. If the rainfall ceases before or at this time, the *bunds* do not hold sufficient water to afford full protection to the area irrigated by them.

26. No.

27. (1) (a) In *ladi*, or high embanked lands, one-third.

(b) In *bera*, or low embanked lands, one-fifth.

(2) (a) In *ladi*, double.

(b) In *bera*, one-half.

28. (1) Nil.

(2) & (3) Nil during the currency of a settlement. On the expiration of the settlement, the land is assessed according to its class, which may have been raised by the irrigation provided.

29. Usually nothing.

30. By the persons interested. Leaving possible breaches in the embankments out of account, this is practically negligible quantity.

31. By amicable agreement.

No.

32. Yes; however, I consider the *rayats* of this district to be too improvident to admit of encouragement being successful.

33. No.; no; no; by re-excavating the tank.

E.—WELLS.

Wells are not constructed for irrigation.

II

Answers to questions in enclosure to Chota Nagpur Commissioner's No. 749.M.R., dated the 14th December 1901.

A.—GENERAL.

1.—The answers below refer to the Palamanu district, where I have been over eight years District Engineer, and was associated with famine relief operation on two occasions during the period.

2.—The initial rainfall records are kept in the Deputy Given as an appendix Commissioner's office, which can F. A. SLACKS.—26-4-1902. best give the information.

3. (1) to (9).—The district is very sparsely populated. The present supply of cattle seems sufficient only for present needs.

I have not seen any but ordinary cattle manure used, and that to a limited extent only.

The soil is generally poor, and black cotton is not very common.

With most of the smaller landlords lack of capital for initial expenditure appears to be the chief obstacle to extension of irrigation.

In the course of enquiries by Mr. Carter, the people consulted were willing to pay enhanced rent or revenue if water for irrigation could be ensured.

5.—During the bad seasons of 1896-97 and 1899-1900 the majority of loan petitions filed were for earthwork in connection with *bunds*, *pains*, *ahars*, dams, etc.; a few only for drinking water wells.

(1) to (6).—It has always seemed to me that much may be done to guard against failure of crops by a judicious system of loans to the smaller landholders, and official guidance and expert supervision in expending them.

I heard no complaints about the rate of interest or the period of repayment. Simplification of the procedure so

that the poorer land-owners may readily obtain loans appears to be all that is necessary.

There is a strong desire on the part of the people to provide the means of irrigation which they instinctively believe to be the only means of saving their crops in a bad year, and giving better crops in an ordinary year.

B.—CANALS OF CONTINUOUS FLOW.

None in the district the physical features of which would not admit of such canals being made economically on any extensive scale.

C.—CANALS OF INTERMITTENT FLOW.

None in the district. There are only a few limited areas which are naturally favourable for this class of irrigation works; but no such project has yet been carried out anywhere in the district. The possibility of this class of work in a few selected and apparently promising areas was inquired into, and reported on, by Mr. Carter to the Superintending Engineer (on special duty), Irrigation Enquiries.

D.—TANKS.

There is no organised system of tank irrigation in the district, and therefore nothing to furnish data for answering the questions under this head.

23. The method commonly used in the district is irrigation from *ahars* or small reservoirs of water formed by earthen *bunds* thrown across catchment basins with a view to intercept the natural surface drainage. There are also more pretentious reservoirs of water formed by damming up *nalas* and small *nadis*, but their number is comparatively very small.

In the case of small *ahars* the water is led to the fields immediately below by a pipe drain or an open cut in the *bunds*. From larger reservoirs *pains* or channels are cut to lead the water to fields more or less distant.

The supply of water is entirely dependent on the rainfall. Timely fall of rain being essential to paddy cultivation, the water in these reservoirs is held in reserve, to be used only when rain irrigation is fitful or fails altogether in September and October.

Ahars or reservoirs commonly made are small, and protect a few bighas to a few tens of bighas only.

24. Very often in a year of scanty or untimely rain these *ahars* make all the difference between a fair crop and no crop at all. In a year of ample rainfall they are generally of little use; that is, in years in which the rainfall is evenly distributed in July, August, September, and October.

26. Not ordinarily, but at critical periods when the supply in the *ahars* has been exhausted, shallow wells are dug as a last resource to save standing crops.

Not in the Government 28. All such *ahars* as those estate and in private above referred to are the private property of the owners of the lands on which they are situated.

F. A. SLACKS.—26-4-1902.

30. Ordinarily such reservoirs require little in the way of repair. Their utility and efficiency as a means of irrigation are necessarily confined to small and detached areas only. This indigenous system appears to be the only one which is suited to the means of the people and the physical characteristics of the district. Whether it is capable of being improved, largely extended, encouraged and guided by official agency so as to give a fair amount of immunity from bad seasons, is, perhaps, a question which is worthy of careful consideration.

E.—WELLS.

34. There is no organised system of well irrigation in the district to enable the statistics required by the questions to be furnished. Shallow and temporary wells are used in especially favourable tracts which offer facilities for sinking them at a trifling cost. Systematic irrigation from permanent wells is not practicable, nor would it be profitable over the greater portion of the district—

(1) In Husainabad and Chatterpur thanas, adjoining the Gva district, perennial wells are usually 30 to 40 feet deep; in the other thanas, 40 to 60 feet deep.

(2) In shallow wells, from percolation generally; in deep wells, from springs and pe colation. In a year of drought the spring level of water goes down considerably lower than usual in the hot months.

(3) The cost varies considerably, depending chiefly on whether rock has to be pierced through or not, from Rs. 250 in ordinary soil upwards to Rs. 2,000, which was the cost of the well, 52 feet deep, 12 feet internal diameter, sunk 30 feet through rock, in the Daltonganj jail.

(5) The water is raised from shallow wells by the usual weighted lever; from deep wells, a skin bag, rope and pulley, and cattle power are used.

35. (2) In Hussainabad thana, on the lands immediately adjoining the Koel river, poppy is irrigated almost wholly from shallow wells 10 to 15 feet in depth. Poppy cultivation would probably be impracticable without such irrigation.

38. (1) The selection of site for a permanent well in a district like Palaman is necessarily a difficult task, inasmuch as the presence or absence of rock in the sub-soil makes a considerable difference in the cost.

(2) There is no unusual difficulty in actual construction. Wells, as a means of irrigation, are not popular, and hence no such advice or assistance has been sought.

39. No. Judged by financial results, well irrigation would be unprofitable, even if it were everywhere practicable.

40. Yes, but only on isolated places where they can be sunk by the cultivators themselves at the cost of a few days' labour.

They are not of much protection against drought, but they have their uses. In lands otherwise unprotected against a sudden temporary failure of rain—natural irrigation,—the loss of crops may be staved off by their means for a time.

ATUL CHANDRA BANERJEE,
District Engineer, Palaman.

DALTONGANJ;
The 30th December 1901.

C. M. O.'s HEAD CLERK—

Will you please give the average rainfall of each month of the year over your signature (see question 2 within marked in red pencil)?

Please return by noon to-morrow.

A. C. BANERJEE,
District Engineer.

The 1st January 1902.

Besides Daltonganj there are nine other rain registering stations in the district. The rainfall records for those stations are not available in this office. They are, I believe, kept in the Deputy Commissioner's office. I am, therefore, unable to furnish the average rainfall for the district. But I give below the amount of rain registered at station Daltonganj during each month of the year 1901:—

Month.	Rainfall in inches.
January	8.03
February	1.93
March	0.20
April	0.45
May	0.25
June	2.33
July	8.08
August	10.12
September	9.04
October	0.49
November	0.03
December	0.00
Total	36.80

A. N. BANERJEE,
Clerk, Civil Medical Officer's Office.

PALAMAN;
The 2nd January 1902.

III.

No. 183, dated Hazaribagh, January 1902.

From —A. H. GARTZEE, Esq., District Engineer,
Hazaribagh,

To—The Commissioner of the Chota Nagpur Division.

With reference to your letter No. 749 M. R., dated 14th ultimo, I have the honour to submit replies to some of the questions from personal knowledge. The numbers below refer to the questions:—

A.—GENERAL.

1. The answers refer to the Hazaribagh district. My knowledge is derived from an experience extending over 26 years as District Engineer of Hazaribagh.

2. The average rainfall in each month of the year is as follows, taking the average of the last five years:—

Month.	Rainfall in inches.
January	1.50
February	1.31
March	0.50
April	0.71
May	2.02
June	9.50
July	10.61
August	11.80
September	9.95
October	2.56
November	0.35
December	0.24
Total	50.35

3. There are obstacles in the extension of irrigation arising from (1) sparsity of population; (2) insufficient supply of cattle suited to the cultivation of irrigated land; (3) insufficient supply of manure; (4) uncertainty of the water-supply, and frequently on its too late commencement and early cessation; (5) lack of capital for the initial expenditure and of funds for the more expensive cultivation of irrigated crops; (6) uncertainty of tenure, and (7) last, though not least, the cursed five years *thicca* system in vogue. (4) The soil is not unsuitable nor (7) is the fear of enhanced rent an obstacle to the extension of irrigation in this district.

4. As far as I am aware, no enhancement of assessment or account of irrigation has yet been made, because very little, or hardly anything worth mentioning, has been expended by the zamindars on irrigation works for the last 30 years to my certain knowledge. No enhancement of rent is made when tenants extend irrigation to their holdings at their own cost. I would suggest that the principal zamindars of this district be compelled to improve their *ahars* or reservoirs, as 90 per cent. of them are practically useless, being silted up and breached.

As the country is undulating, it is very easy to construct *ahara bunds* or reservoirs to impound water during the rains. An ordinary new reservoir, or *ahara bund*, does not cost more than from Rs. 400 to 500; such reservoirs are most useful to cultivators in this district, where canals do not exist.

These *ahara bunds*, or reservoirs for storing water, have proved most useful for irrigation purposes in this district, and the *mukararidars* or ranyats who have constructed them feel no difficulty whatever in cultivating their lands in due time. In the Hazaribagh district the average rainfall is about 50.35 inches in each year, and even if it were less, it would be quite enough to fill our *ahara bunds* or reservoirs.

The failure of crops in this district is by no means the result of scanty rainfall, but is due to untimely and irregular rainfall. It will be seen from Mr. Forbes' last quinquennial report that the rainfall in the first part of the year 1896 was much more than was required, whilst in August and September the rainfall was unusually scanty, resulting in the wholesale failure of crops, whilst in 1897-98, though the rainfall was below the normal, it was very favourably distributed, consequently there was a good crop.

If water could be stored, even in small reservoirs, all over the country, above a *dohur*, or rice lands, sufficient

Mr. F. A.
Slacke.
3 Nov. 03.

Mr. F. A. Slacke.
3 Nov. 02.

irrigate it from time to time, i.e., occasionally, till the end of October, there would be no fear whatever of the failure of crops in this district, even if there was no rainfall during the *bathia*, the critical period for rice irrigation.

In this district there still exist a number of large and small *ahara bunds*, or reservoirs, constructed long ago; and although they are not protected by concrete walls, stone packing on inner slopes, or by rubble pitching outside, they are still intact, though silted up and practically useless; and all that is needed is to remove the silt, and to line the escapes with *pakke* rubble masonry to make them useful. An *ahara bund* once silted or breached is seldom or never repaired in this district. The reason of this is that the ryat looks to his landholder for the necessary repairs, but the landholder, in most cases, is hopelessly involved in debt to spare anything for the benefit of his ryat.

In my humble opinion legislative measures may be adopted to compel the landholders to repair (by instalments) the existing *ahara bunds* and to construct new ones, where necessary, by advancing them money on rates of interest lower than what can be allowed under the Land Improvement Loans Act.

In the event of their failing to comply with the request of Government in this respect, Government may be empowered to do the work for them, and to recover the cost of the same from them at low rates of interest.

5. Loans under the Land Improvement Loans Act are not freely taken by people for the extension of irrigation reservoirs, owing to the difficulty experienced by cultivators in obtaining them, not to mention the oppressive measures usually adopted in realising them. These loans are very unpopular. For the encouragement of these loans, I would suggest the following measures:—

- (1) partial remission of advances;
- (2) total remission in bad years;
- (3) Extension of the period of repayments, and
- (4) grants-in-aid.

6. There has been no opportunity to find out this.

The cultivators in this district are most anxious to get new *ahara bunds*, or reservoirs, constructed, and old ones repaired and cleared of silt; but they have no funds to do the work, nor will the principal zamindars assist them in tiding over their difficulty.

Above all, I would suggest the establishment of agricultural banks.

All advances should be made (locally) by responsible officers, not below the rank of a Deputy Collector, after personal enquiry, not depending on any *amlak* or ministerial officer.

B.—CANALS OF CONTINUOUS FLOW.

None in the district, nor is the undulating and hilly nature of the country suited for canals.

C.—CANALS OF INTERMITTENT FLOW.

The same remark as above.

D.—TANKS.

Tanks are never used for irrigation purposes in this district.

Their place is simply supplied by *ahara bunds*, or reservoirs.

E.—WELLS.

Wells are never used for irrigation purposes in this district, except shallow, temporary wells for poppy cultivation.

IV

No. 896, dated Puralla, the 14th January 1903.

From—BARU LALIT BEHARI SAHA, Overseer in charge of the District Engineer's office, Manbham.

To—The Commissioner of the Chota Nagpur Division.

In reference to your letter No. 749 M. R., dated the 14th

The replies to the questions were all noted by me before they were submitted. I have now gone through them again. I have nothing more to add, excepting what has been noted in the margin against replies 31 (3) and 33 (1) and (2).

N. G. BANERJEE,
District Engineer.

The 28th March 1903.

A.—GENERAL.

1. The answers given below refer to the Manbham district and are based upon general observations made in the ordinary course of my duties when travelling in the interior of the district.

2. A statement of the average rainfall in each month is annexed. This has been compiled by taking the average actual rainfall in each month for the ten years ending in December 1901, as obtained from the register maintained in the Deputy Commissioner's office.

3. There is no regular system of irrigation resorted to in the district. The crops chiefly depend upon the rainfall. The only form of irrigation is from *bunds*. The surface of the country is very undulated. These *bunds* are generally constructed by throwing earthdykes across declivities or natural drains or ravines at a high level for heading up the drainage, thus forming a sort of a reservoir with the natural ridges or high lands on three sides and the dyke on the fourth. In years of scanty rainfall in the sowing season, this water is run out through cuts or drains across the dyke for preparing the soil for the sowing or transplantation of crops. Similar means are adopted for protecting the standing crops from withering up. This refers to the winter paddy crops only, which is the chief crop in the district. Water from the *bunds* is also lifted and baled out for irrigating small patches of lands for the *rabi* crops. The utility of such *bunds* altogether depends upon the size and site of the *bund*, their capacity and the rainfall between January and June.

From the above it will appear that the several sub-questions under question 8 cannot be definitely answered. The following, however, may be noted:—

- (1) No.
- (2) The general condition of the cattle is very poor.
- (3) Yes.
- (4) No, so far as I am aware of.
- (5) Yes.
- (6) Yes.
- (7) No.
- (8) The tenancy law is not in force in this district; uncertainty of tenure is, however, no obstacle in this district, excepting in cases of waste land brought under cultivation without a regular settlement of the terms of the tenure.
- (9) None that I know of.

4 Land which is irrigated—rather brought under cultivation from works constructed by private capital—is generally exempted from assessment for five years, after which the land is assessed at current market rates and a concession of six annas to the rupee is made in perpetuity to the occupier.

Tenants, as a rule, seldom extend irrigation to their lands unless the assessments are fixed permanently, partly for want of means and partly for want of encouragement from their landlords. For encouraging irrigation even in the form in which it exists in the district, tenants should, I think, be protected against undue assessment by the landlord. My imperfect knowledge of existing provisions of the law prevent my stating whether they are liberal; but I am of opinion that the tenant ought to get at least an equal share of benefit derived from irrigation works constructed at his expense.

5. I am under the impression that loans under the Land Improvement Loans Act are not freely taken. This is chiefly due to an absence of enterprising spirit amongst the agricultural community generally, and partly to the difficulties experienced both in obtaining and repaying the loans. The general impression is that the majority of applicants from rural tracts seldom receive the full amount they apply for, and have often to pay more than what may be due from them—

- (1) The rate of interest should not be more than 6 per cent. per annum, but need not be less than 4 per cent.
- (2) I would not recommend remission of interest, excepting in special cases, to be determined by the Deputy Commissioner, as this is sure to have a demoralising effect, and is likely to lead to diversion of funds thus obtained to objects other than the purpose for which the loan may be advanced.
- (3) Same as (2).

This can be guarded against by not granting any advances for works, the success or utility of which is doubtful. For reasons stated in (2), I am not in favour of any remission, excepting in very special cases.

- (5) This is likely to be a very healthy encouragement.
(6) I am not in favour of this.

6. No, so far as can be noticed in Manbhum.

B.—CANALS OF CONTINUOUS FLOW.

None in Manbhum, and the questions therefore do not apply to this district.

C.—CANALS OF INTERMITTENT FLOW.

None in Manbhum, and the questions therefore do not apply to this district.

D.—TANKS.

23. (1) to (4) Kindly see (3) above.

24 to 33. In the absence of any regular system of irrigation and my absence of experience in this matter, I am unable to submit proper replies to those questions.

E.—WELLS.

34. (1) The average depth of a permanent well is 30 feet.

(2) Permanent wells depend upon springs. They seldom fail or become too saline.

(3) This depends upon the size, the nature of the soil through which it has to be excavated, and the depth of sub-soil water. The approximate cost of a well, six feet in diameter, of the average depth, excavated through ordinary soil, is Rs. 470.*

* This includes cost of constructing a fakka masonry ring inside.
N. G. BANERJEE,
District Engineer,
The 18th March 1902.

(4) Cannot exactly say. I know that wells constructed over 20 years ago are in as useful a condition as regards supply of water, as they were when they were first excavated. This, however, refers to wells, which are restricted, for drinking water, and are seldom used for irrigation purposes.

(5) The water is raised by, buckets and ropes passing round a rough pulley fixed on the top of the well or at the end of a long lever (a wooden pole) weighted at one end and fixed on a wooden post.

(6) } Not known.
(7) }

35 to 37. Same as the reply to questions 24 to 33.

* In Manbhum people seldom go in for wells, either for irrigation or drinking purposes. In cases in which they are resorted to (such as in towns for drinking purposes, and in rural tracts for growing vegetables in comparatively small quantities), the men who undertake the works do not, as a rule, require any assistance. The latter class of wells are mostly cheap and lacking. I do not think officers of assistance in the manner indicated will be at all useful or appreciated.

N. G. BANERJEE,
District Engineer,
The 18th March 1902.

38. * (1) and (2) No. No assistance to my knowledge was ever applied for and none was rendered.

39. No. Because wells in this district are not likely to be of any particular use for irrigating the principal crops.

40. Wells for irrigation to any extent worth noticing are not used in this district. They are sunk here and there for growing vegetables in high lands, but their number, or the extent of their usefulness, is insignificant.

In conclusion, I humbly beg to submit that, not having much personal knowledge or experience in this subject, and the permanent District Engineer being away on leave, I could not submit this report earlier. The above is based upon notes which I have obtained from the permanent District Engineer.

Statement of the average rainfall of each month for the ten years ending 31st December 1901.

NAME OF MONTH.	Monthly rainfall during the year.										Average monthly rainfall during the last ten years.
	1872.	1873.	1891.	1893.	1894.	1897.	1898.	1899.	1900.	1901.	
1	2	3	4	5	6	7	8	9	10	11	
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January	0.00	0.83	0.00	0.43	0.00	0.56	0.08	0.81	1.04	2.30	0.50
February	1.01	4.14	0.51	0.17	0.00	0.75	0.26	0.30	0.59	2.53	1.80
March	0.60	1.87	0.00	0.79	0.00	1.98	0.06	0.00	0.72	0.43	0.58
April	0.40	1.55	0.56	2.74	0.00	0.84	1.41	1.53	3.18	1.05	1.32
May	1.66	6.70	1.71	1.14	0.69	2.12	1.72	3.08	1.98	1.82	2.24
June	8.89	11.44	12.13	6.03	2.41	4.42	13.05	0.55	6.10	3.92	7.78
July	13.72	19.81	15.09	9.05	11.24	12.96	12.57	18.93	0.22	10.37	13.05
August	6.67	10.67	14.73	10.05	11.50	13.49	12.66	6.10	10.82	13.49	11.01
September	7.50	11.53	8.53	6.36	5.76	5.55	13.74	10.39	20.00	11.14	10.05
October	4.01	3.23	1.25	1.40	0.10	5.77	3.50	1.03	1.48	2.13	2.46
November	1.37	0.00	1.14	2.31	0.15	0.20	0.00	0.00	0.00	0.07	0.58
December	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.01

N.B.—The figures in column 2 have been compiled from the Calcutta Gazette and those of columns 3 to 11 from the register maintained in the Deputy Commissioner's Office.

MANDHUM ;
The 14th January 1902. }

S. B. SAHA,
Overseer in charge of the District Engineer's Office.

Mr. F. A. Slacks. *Answers to "questions for Revenue Officers, etc.," in connection with the Indian Irrigation Commission.*

A—GENERAL.

3 Nov. 02.

1. The answers refer to the district of Ranchi. I have had opportunities of visiting the interior of the district, having been Manager of the Wards' and Encumbered Estates in it since 1896.

2. The subjoined table shows the average rainfall in the district in each month in the year, then average being taken for the last three years:—

YEAR.	MONTH.												Total of the rainfall year.
	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	January.	Februa-ry.	March.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
1899-1900 . . .	2 89	1 03	8 75	12 63	6 29	2 80	0 15	0 03	Nil	1 66	0 74	Nil	37 08
1900-1901 . . .	0 63	4 83	8 86	7 51	15 08	15 41	4 10	Nil	Nil	3 33	4 06	0 41	64 25
1901-1902 . . .	1 00	2 12	0 76	11 81	14 18	16 43	1 01	0 03	0 1	Nil	0 93	1 43	49 88
Total . . .	4 51	7 98	18 37	31 98	35 55	34 70	5 26	0 11	0 1	4 99	5 73	1 87	151 16
Average . . .	1 53	2 66	6 12	10 66	11 85	11 56	1 75	0 3	0 03	1 66	1 91	0 62	50 38

I have taken the official year, as it corresponds very nearly with the agricultural year.

3. No regular system of irrigation obtains in this district. The only works of irrigation are the *bunds* or reservoirs of water, constructed by making embankments on *nalas* or natural drains and hill-streams. The *bunds* get their supply mainly from flow of water during the rainy season from the adjoining hills and high lands, and come to the use of cultivators in years of scanty or irregular rainfall. They also benefit the lands below by percolation. Water from the *bunds* is brought into the fields through *pains* or water passages which are constructed on both ends of the embankment. Sometimes the water is taken out by cutting the embankment, the cut being afterwards filled up. In this district *bunds* and wells are, I think, the only suitable forms of irrigation. The country is undulating, and the construction of irrigation canals will be disproportionately costly, especially as there is scarcely any river in the district which contains copious water in all seasons to enable the canals to draw their supply of water from it. There are *bunds* in some villages, but several of them have got silted up, and are of no use at present. It will be a good thing if each village gets at least one *bund* in a suitable place. Some of the villages are big and comprise of several hamlets. These hamlets are practically separate villages, and should each have a *bund*. The cultivating people of this country are generally poor, and no enhancement of rent should be looked for from construction of *bunds*. But their construction by landlords will increase their income by bringing new lands under cultivation and by turning up-lands into rice-field. It will also insure punctual payment of rent by the rayats. In answer to the sub-questions separately, I beg to submit that there are scarcity of population in some tracts and insufficient supply of cattle and manure, but this will not hinder construction of *bunds* and wells. The soil is suitable for such works, and if wells are sunk in rice-fields, water can be reached generally by digging the earth only a few feet. If *bunds* and wells are constructed, the supply of water will be certain and regular, and there will be no chance of failure of crops. There is lack of capital. I think the landlords should be advanced loans under the Land Improvement Loans Act, under more liberal conditions, and agricultural banks should be established in each agricultural village for the benefit of the cultivating rayats.

There is fear of enhanced rent, and there should be a law to the effect that when the rayat constructs *bunds* and wells at his own cost, the landlord should not be allowed any enhancement on that account for a pretty long period, say, 15 years. The uncertainty

Tenures which can be resumed falling male heirs in the male line of the original grantee.

F. A. SLACKS,
Offg. Commissioner.

of the *putra pantradik jagirs* in this district is an obstacle to improvements being executed by under-tenure-holders, who hold their under-tenures in subordina-

tion to the jagirdars of the Maharaja. But this does not affect improvements being made by occupancy rayats or rayats holding *korkar* or *bhunihari* lands. There is one obstacle which stands as a bar to improvements being executed in this district by rayats. It is this, that the rayats owning rayati lands cannot construct *bunds* or dig wells, except with the permission of the landlord. I think that there should be a law to the effect that every occupancy rayat will have the right to construct a *bund* or dig a well on the land he holds without having to obtain the permission of the landlord.

4. Lands newly brought under cultivation by the construction of *bunds* or otherwise by private capital are exempted, according to established custom, and not usually under written documents, from payment of rent generally for three years and, in exceptional cases, for upwards of that period until the lands are actually brought under cultivation. When the period of exemption expires, the lands are assessed at half the rate of rent prevailing on the village for ordinary Raja's lands, excepting *pargana Silli* where the assessment is made at $\frac{1}{2}$ or $\frac{2}{3}$ part of the prevailing rate of rent, and in *pargana Biru, Barore, Tamar, Bandu, Rahey, and Barendra*, where the rayats are not allowed the privilege of paying rent for newly-made lands at a reduced rate. I would recommend that the privilege be extended to the rayats in all parts of the district. The newly-made lands allowed to be held at a reduced rate of rent are called *naya-abaadi* in *pargana Silli* and *korkar* elsewhere. If any rayat constructs, with the permission of his landlord, a *bund* for the improvement of the lands which he already holds, he has not to pay any enhanced rent, but has to pay rent at *korkar* rate for uplands which are converted into rice-fields. But cases in which rayats construct *bunds* for the improvement of the lands they already hold are very rare, principally because the rayats are poor and generally live from hand to mouth, or even worse, as a considerable number of them often have to borrow money at high rates of interest for purchase of seed or plough cattle. The greater portion of the crops harvested by the poorer classes of the rayats go to their creditors and towards payment of rent due to the landlord, and the surplus which remains is not always sufficient for the year's consumption. This is why emigration is so general.

5. Loans under the Land Improvement Loans Act are not taken freely by the people for the construction of *bunds*,—the only form of irrigation obtaining in the district. As they fear to take Government money, I would not recommend reduction of the rate of interest, or remission of interest or advance, or grants-in-aid. I would recommend only extension of the period of repayment.

6. The extension of irrigation by the construction of new *bunds* and wells and re-excavation of silted up *bunds* will not injure the existing cultivation. It will rather improve it. The people in this district evince a strong desire to have *bunds* in their villages.

B & C.—CANALS.

I have nothing to say about these questions, as there are no canals in this district.

D.—TANKS.

Tanks are scarcely used for purposes of irrigation in this district. The *bunds* take their places here.

E.—WELLS.

Wells also are not used in this district by cultivating rayats for purposes of irrigation. But I think they can with advantage be used. The residents of the towns of Ranchi and Lohardaga and their neighbourhood use wells for the purposes of irrigating vegetable gardens.

RANCHI;

TRIPURA CHARAN RAY,

The 18th April 1902.

General Manager.

Mr. F. A. Slacks.

3 Nov. 02.

1. Q. (The President).—How long have you known this district?—I have been here 8½ months, but I was Settlement Officer 16 years ago for 3½ years for administered estates in each district.

2. Q. Mr. Macdonagh in his report quotes from your predecessor, Mr. Forbes, dated October 10th, 1901. On page 197 he says—"My own opinion, stated generally, is that Government would not be justified in undertaking any of these schemes, or indeed any other irrigation scheme in Chota Nagpur." And he repeats that rather strongly. Do you generally agree with him?—To some extent. No irrigation scheme would pay unless the present law is changed. Great difficulty is experienced in Government estates as regards the maintenance of the *bunds* made with Government money. In Palamau especially there are 1,200 of these *bunds* which are never regularly kept in order, because it is not the interest of the rayats to keep them up. There was no proper local supervision, but this is now being organized, and it is hoped that the *bunds* will then be looked after. If you make it the interest of the rayats to do so by making it illegal to enhance a man's rent on the ground of such improvement, it would be a good thing for the Government to assist the rayats generally. But until the law is changed it would be a waste of money.

3. Q. Is that what you refer to in answer to question No. 7 "with regard to the nature of the tenancy the existing doubts will, in the course of the next few years, be removed"?—Yes. The rayats know that if they make an *ahar*, the landlord will certainly enhance upon the improvement. Consequently they won't do it.

4. Q. Is there any likelihood of legislation being affected?—I think so. At present there is a bill to amend the present Land Tenure Act, and it is to be passed into law this cold weather. I hope that is only a preliminary. A survey and record-of-rights is being made in parts of Ranchi, and from the information which will thereby be obtained the existing Act will be cancelled and a new one brought in which I hope will remove difficulties.

5. Q. The landlord is not to be allowed to enhance?—No. The Bengal Tenancy Act prevents that with regard to improvements made by rayats for all time. In this part it may be prevented for a certain time only. The principle is the same with a modification. Here you have the *karker* system which has been very successful. The terracing of the fields here has been done entirely by the rayats, the landlords have never done anything. A man turns upland into rice land by terracing it. The field so made is called a *karker* or *khundwat* or *uriah* field. The maker holds the field so made at a privileged rate of rent for a length of time which varies in different parts. Sometimes it is for end and sometimes for a definite period. It would be better to apply this recognized principle to *ahars* made by rayats than to introduce the Bengal system. The whole country has thus been terraced and the same result would happen with regard to *ahars* if the same security existed.

6. Q. Do you refer to that in answer to question 10—"I would suggest that after the expiry of the period, for which the land improved may be held subject to no additional rent, the tenant may be called upon to pay enhanced rent; the new rental, however, not to exceed what the rental of the land would be at the rates next, but one below those prevailing for lands of the same quality in the village"?—Yes.

7. Q. Apparently the zamindar will not borrow money to improve his estate?—Where he has the inclination to improve his estate he does not have the money. He knows that if he borrows the money, it has to be distributed by his servants and not half of it will be spent on the land. He never goes to see his lands. I only know of one landlord in the whole division, who is really keen about improvements. Some won't allow the rayats to make any improvements themselves. The landlords here are always more or less in debt and periodically have to apply to be brought under the Encumbered Estates Act.

The Wards and Government Estates and Encumbered Estates cover, roughly speaking, a third of the whole of this division.

8. Q. Some of them, I understand, are permanently in the hands of Government. It is not merely that the landlord is in debt?—There are very large Government Estates.

9. Q. Are they held on a rayatwari tenure?—Almost all. Until quite recently a very large Government estate in Palamau was let out to *thikadars* ever since the original settlement, but under the new settlement of 1897 it has been made rayatwari.

10. Q. Is there anything to prevent the tenants availing themselves of the Land Improvements Acts and putting their works in order?—They always have the fear of having their rents enhanced.

11. Q. Even by Government?—It has never been said that it should not be. The law allows it. The villages might be put under *thikadars* again. Then the *thikadars* would come in and enhance the rents.

12. Q. You think there is nothing for it but this tenant right?—Some system to make it the interest of the rayat to make the *bunds* and keep them in order is needed. I have seen cases where to get fish; the *bunds* have been cut by the rayats and then patched a little mud with the result that the *bunds* went the next season. It is not to their interest to repair them properly.

13. Q. It is really the fear of enhancement and not apathy?—That they will work for their own interest is shown by their terracing. Think of the crores of rupees represented by that labour. It is all done by them, because they get a return for their money.

14. Q. In the old days had they a security they have not now?—They had security for terracing lands which they still have. No landlord would think of infringing that.

15. Q. Are these terraced lands in a better position than the *bunds*?—Yes. The bulk of a zamindar's rental is from the rice lands, and therefore the fewer rice lands a zamindar has the less his rental. Consequently he has a keen interest in including the rayats to increase the area of the rice lands.

16. Q. In reply to question 9 you say—"In all probability there will be many cases in which a tenant, desirous of making an *ahar*, cannot do so, as some land necessary for the scheme is not in his possession." Mr. Horn says they do have a method on the Sonc canals. To secure land for village channels paid for by the villagers on the Sonc canals they have a procedure by which the land is acquired by the land acquisition officer and 10 per cent. is charged for establishment charges?—That would be much too expensive and much too lengthy. Some simple system is wanted such as that in force in the Kolhan. The headman of the village refers the matter to the Deputy Commissioner, and if it is waste land it is given, and if it is somebody else's land it is valued. The rayat who wants to make the *bund* pays the value assessed for the land required unless the Deputy Commissioner is able to give the man ousted some equally valuable land elsewhere. It works very well.

17. Q. On what authority is it done?—Under the record-of-rights.

18. Q. Is it desirable to have legislation compelling the landlord to keep his *ahars* in order?—No. How are you to enforce it? You would have to leave an immense staff to go round to see that these *bunds* are being kept in order, and that staff would probably blackmail right and left and certainly live at the expense of the rayats. To have a working system *you must make it to the interest of the rayat to keep the works in order.*

19. Q. Our last witness suggested that there should be a cess on the land, and that the District Board or the District Engineer should do the whole of the repairs?—He has all he can do now.

20. Q. You might employ another?—How can one man look after all these *bunds* for a district like this, or for 6,000 square miles in Hazaribagh, 7,000 in

Mr. F. A.
Slacke.
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Ranchi. Then, if you increase your men, your funds will be absorbed in salaries, and besides there would be the delay and the blackmailing by the lower subordinates.

21. Q. You have sent in a paper by Mr. Thomson, Deputy Commissioner of Singhbhum, and he mentions the Kolhan Estate "for improvement of which Government allots about Rs. 10,000 annually, out of which about $\frac{1}{3}$ or $\frac{1}{4}$ is annually spent for making bunds for irrigation." Does that estate pay?—Yes. But there is no recognised working programme. It is simply a case of from hand to mouth. If a man wants a bund and there is no money, it is put off till the next year. I want to have some definite working plan showing for each village how many bunds are wanted.

22. Q. Will that require an officer especially for the purpose?—No, the talisildars can work it out by degrees.

23. Q. Is a talisildar capable?—They are small bunds for irrigating from one acre to about fifty acres.

24. Q. We have had a few projects put before us on a bigger scale altogether. Do you believe in them?—I have only seen one, the Pakrahar. I certainly think that one might be tried. The Nadowa possibly. Let one be tried in order to show whether this opinion is correct or not. It is founded a great deal upon hearsay among the people. Consequently some authorities say one thing and some another. The people certainly do believe that if such works were they would be of very great assistance, and if one were carried out, we should have something to point to. We want some system of utilising the water running away in these nullahs, to fill up the ahars in years of drought. As to whether there is any place where a big lake can be made, there is one, I am told, on the confines of Singhbhum and Ranchi, in which a very large amount of water would be stored up. It is a big valley, fed by mountain streams, and has a very narrow opening, which would be embanked and then by means of a channel the whole plain below could be irrigated. The channel would, however, have to be about 7 miles long. The information was given me by a missionary at Chaibassa. It would irrigate a part of Singhbhum north of the railway line and near Chakardihpur.

25. Q. Do you think that is worth investigating?—Possibly. I was told there was a great waste of natural material there.

26. Q. Is it a part of the country where they would be glad to have irrigation?—Yes.

27. Q. (Mr. Horn.)—You would want a big dam?—I am told the opening is only 300 yards long.

28. Q. (The President.)—Is there any scope for the extension of well irrigation?—None.

29. Q. Why not, because of the rocky soil?—Yes; to make a permanent well is very expensive. Well cultivation is used only for lands just round the peoples' houses and they do not value that cultivation so much as the rice.

30. Q. On the other hand, a well would not fail then in time of drought?—Wells always fail at the beginning of April. My own go very deep, but I had to get water from a lake. In Hazaribagh this last hot weather the whole town drew its water from one tank and one well; all the rest had gone dry. One class which does use wells is the Koeries, the professional market gardeners, but they are much more advanced cultivators than these people.

31. Q. Are the people industrious?—They will work hard for themselves, but not for anybody else. Drink is the great curse amongst them. They complain that we put too many obstructions to their getting drink. The Kols are the people I refer to.

32. Q. (Sir Thomas Higham.)—You are not very much in favour of making these small projects that have been examined. Have you any preference?—No; but I would favour one that did not cost much. One costs 31 lakhs. I believe; I would not take that. One costs Rs. 70,000; I would take that up. I would like to take up a scheme in Palamanu where five projects have been proposed.

33. Q. All these schemes irrigate a great deal of Government land, and the return for them would be looked for eventually in increased rentals?—Plus the less need of cost for famine.

34. Q. How long would you have to wait for the increased rent?—The rayats would agree to pay at once with regard to lands already under rice cultivation and which were improved by the work. But with regard to other lands which had to be terraced or otherwise rendered fit for rice cultivation, a certain period would have to be given before the enhanced rent could be demanded. It would depend whether

the Board of Revenue would accept it. The Board of Revenue might say, as they have already said, that it is not advisable to take an increase of rental during the currency of a settlement. They would, I understand, postpone carrying out these schemes until the present settlement has expired.

35. Q. That is, in 1911?—About that. They have never expressed any opinion adverse to these schemes themselves, simply as to the time of carrying them out. The Board have been told that the people are willing to pay now.

36. Q. What is the Board's objection? Do they think that if they wait till the end of the settlement, they could raise the rents to a greater extent?—No. It does not please them. A settlement has been made and the rentals fixed, and hence it does not seem right to the Board for 15 years to step in now and raise the settled rent, because of improvements made during the currency of the settlement.

37. Q. Would it not be a good thing to carry the schemes out at once even if the rents were not raised, for, when the time comes for raising them, you will have had a little experience to go on as to the value of the works?—I should say, carry out one, whether you raise the rental or not.

38. Q. You do not think you can raise the rental directly you have constructed a work before you know what it is going to do? You might put it up to more than the rayats could pay?—I would not take the increased rent from the rayats until it was shown to be of some benefit. The enquiries would not take long. These small schemes do not irrigate such large expanses of country.

39. Q. What about land of which Government is not the landlord?—I understand the zamindars would contribute part of the cost.

40. Q. Would they?—They say so.

41. Q. In the form of taking a loan for it? A part of the cost would be debited to them?—Possibly. It depends on whether the man is impecunious or not.

42. Q. There would be no question of a water-rate in that case? They would be entitled to their share of the water in consideration of the contribution they made?—Yes.

43. Q. You think the main thing in this district is to increase the number of ahars through the tenants?—Yes.

44. Q. The inducement to the tenants would be that their rent would not be raised—for how long?—It all depends on the amount of work the man has done and whether you adopt the principle of the rest of Bengal or that which holds locally in the case of Kerker.

45. Q. You propose that at the expiry of the period, for which the land may be held subject to no additional rent, the tenants may be called on to pay an increase of rent?—Because that is in conformity with the existing system of terraced lands.

46. Q. He would pay a less rent than the rayat would who had not made the lands, who succeeded to somebody else's labour. Would that be a sufficient inducement?—Yes, as you see by the crores of rupees represented by the terraced lands in these parts.

47. Q. Would you give them some right and privileges to make ahars?—Yes, I would give them some vested interest in making these ahars.

48. Q. Have they not such rights?—Not that I am aware of. They run the danger of having their rents enhanced.

49. If they had these rights, would they make them?—I don't say you would have the country covered with ahars at once. It takes a long time to get ideas to sink into their heads and to realize a change.

50. Q. You think they are really prevented?—I think so.

51. Q. They want some pecuniary assistance?—They have found money of their own to make these terraced rice fields. There are no loans for this.

52. Q. You don't think they will depend on Government for loans?—I don't think so to any great extent. If they have been able to work these fields without loans, why should they not make petty bunds, etc., without loans.

53. Q. Have you started anything in the way of agricultural banks?—They are just beginning. I cannot say anything definite about them. There has not been time enough to judge of them yet. They have advanced out the money that has been lent to them, but the time has not yet come for the repayment of the first instalment.

54. Q. They have advanced money for improvements?—It is supposed to be for improvements.

55. Q. How long have they been started?—Some have been started in May and some in June.

56. Q. Who manage them?—The people themselves.

57. Q. The landlords?—The headmen of the villages; the leading rayats of the villages.

58. Q. You have got them in every district?—No. We have not got them in Singhbhum; we could not have them there; the people are too illiterate. We have got some in Ranchi and some in Hazaribagh; these are all that I can remember. I don't think there is one here (Purulia).

59. Q. (Mr. Muir-Mackenzie.)—If I understand you correctly, Mr. Slacke, you think the zamindars are not likely to make these improvements—not anywhere, not in any district?—Yes. You may find an individual like the zamindar of Untari doing so, but there will not be many others.

60. Q. You mean not generally, not for instance in Palamau?—Well, the Raja of Chainpur may carry out some; he is a good landlord.

61. Q. I understood Mr. Lyall to take a more hopeful view. He seemed to think that the zamindars, if they were able to raise their rents, would see the advantage of making these improvements?—Why have not they done it before? Instead of this they are running into debt. One can only say the proof of the pudding is in the eating of it. There is the fact that at present you have two of Mr. Lyall's most influential zamindars who are likely to have their estates brought under the Encumbered Estates Act too. They are all reckless—at least the bulk of them.

62. Q. Mr. Lyall's view seemed to be that if they got advances given to them by Government, they would easily take the money?—They would take them.

63. Q. And would spend it on improvements, because they would be immediately recouped, sometimes getting as much as 75 per cent. on it?—Then, if a man could do that, why not spend his money on these profitable improvements instead of recklessly getting into debt?

64. Q. He understands it is remunerative. In one of the Court of Wards Estates, in which they spent Rs. 11,000 on improvements, they raised the rental from Rs. 13,000 to Rs. 25,000?—I have not got the figures. These improvements are very remunerative as I have mentioned. They are so remunerative that the Untari zamindar will not allow his rayats to carry out any improvements. He makes them all himself.

65. Q. (The President.)—There might be a respectable zamindar who succeeds to an Encumbered Estate?—It is quite possible, but there are very few such cases.

66. Q. (Mr. Muir-Mackenzie.)—There are considerable areas under Government Estates?—Very large.

67. Q. Are you at all satisfied with the amount done on them?—No.

68. Q. Do you consider that all that could be done has been done?—By the rayats?

69. Q. By Government with the object of increasing its rental?—It has spent money and enhanced its rental in consequence.

70. Q. I understand you to say there are only small improvements?—Because they are only small works. You put up a bund by which five acres of land are irrigated and an increased rental obtained. Government does this. But the difficulty comes in with regard to the maintenance of these bunds, which the people themselves will not do.

71. Q. On account of the difficulty of maintenance you don't think considerable profit would be made?—I would rather have the people do it themselves and keep the profit to themselves.

72. Q. The more underlings you have going about in an estate, the worse it is for that estate. We are about to introduce a system into the Government Palamau estate by which the headman in each village will get a little piece of land in return for which he must among other duties look after these bunds. Of course I cannot yet say whether it will succeed or not.

73. Q. So that even in Government estates you would infinitely prefer to see improvements in ahars made by the tenants themselves?—Yes.

74. Q. You seem to me to prefer a temporary exemption from advancing the tenants' rent to the permanent exemption as being more in accordance with the custom of the country?—Yes.

75. Q. Are you quite clear that would be a sufficient inducement?—Yes, because of the example of the terraced lands here.

Ben.

76. Q. How far have the tenants at present in Chota Nagpur got occupancy rights?—It depends on the will of the landlord, but they have got it under the law. If a man can prove he has been continuously paying rent for a certain bit of land, he has got the right of occupancy in it. They do not know their rights and it is difficult to prove them. If it comes to a survey and a record-of-rights, you will find that the bulk of them really have occupancy rights.

77. Q. Has there been any record-of-rights made for the Government estates?—Yes.

78. Q. Have they got their occupancy rights in those estates?—Yes. The Government never ejects their tenants like private zamindars do.

79. Q. They are liable on the Government estate to enhancement of rent at the conclusion of settlements like other occupancy rayats?—They would even in Bengal under certain conditions be liable for enhancement of rent.

80. Q. Is there any danger of those ahars proving useless in a famine year by being exhausted?—Yes.

81. Q. The evidence on that point seems to me to be a little conflicting. The last two witnesses have been most emphatic in declaring that they will hold water in a bad *kathia*?—If the water is there, they can hold it, but in a bad year, unless there is some source to replenish them, they would not.

82. Q. That is to say, that must be connected with some streams?—Yes.

83. Q. Is it not likely that if the ahars are in good condition and are not backed with silt, there would be sufficient rain to fill them?—Yes, but then a great deal depends upon the time when the rain falls. It might fall in a suitable month and then it would be all right, and it might fall in a non-suitable month and then the ahars would be dried up.

84. Q. Say you had 20 inches of rain up to the middle of August and none after that, would the ahars be empty?—No, I do not think they would, but I do not say they would be full: there would be a certain amount of water in them. But if your rain fell heavily in July, and you had merely scanty showers in August, then "no."

85. Q. You have pointed out how the advances, if made to the zamindars, would be misappropriated. Do you think there would be no similar danger if they were advanced to the tenants?—Of course there would be in some cases, but the amount which would be asked for advances would be very little. The rayats do not like taking advances from Government, because of the conditions under which the sums are realized. If the system were improved, then you might have more demands.

86. Q. With that change of system would you be able to dispose of any considerable sum?—I think so.

87. Q. How much do you think you could dispose of in your division?—I should think we could dispose of four lakhs a year easily. The needs of Bengal are never met by the Government of India. I think I am right in saying that the amounts asked for by the Government of Bengal are never granted by the Government of India.

88. Q. (Mr. Rajaratna Mudaliar.)—Would you like to see the rate of interest reduced from 6½ per cent. to 5 per cent. as in Madras, and the period for repayment extended from 20 to 30 years? Would that afford a greater stimulus?—I think not, because the 6½ per cent. is so very little as compared to what they pay their native mahajans here, and then 20 years seems to me quite long enough. If you have a proper system of distribution and realisation, I think 20 years and 6½ per cent. is fair enough.

89. Q. As regards the system of distribution, would you employ officers of the standing of Deputy Collectors?—I would employ gazetted officers of the lowest grade to go out locally.

90. Q. What does Government pay for the money?—4 per cent.

91. Q. Then the difference between 6½ per cent. and 4 per cent. ought to cover the cost of any additional establishment that may be employed?—Then you have to meet losses. If the crops fail and the men run away, there is nothing to be realised from them and the amount has to be struck off. I have never seen any balance sheet struck, but I do not think it is a paying business to Government. After you take your 4 per cent. away, then I think Government loses.

92. Q. Then, as regards realisation, what are the best means? You have no village agency for that?—Yes, in several of the districts here, we have a village agency for that. We have a recognised headman in some places, he is called a *moonda* and in other places

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he is called a *mauki*. He is the recognised headman of the village, and you can work through him.

93. Q. You said you would prefer to see *ahars* constructed by the tenants. I suppose they will be able to construct *ahars* only in their own holdings. Where an *ahar* falls in another man's holding are they likely to combine?—No. There is a want of combination among them.

94. Q. In such cases what is to be done? Government, I suppose, ought to step in in such cases?—If it were absolutely necessary, they would do so. In a country administered like the Southal Pergunnahs the Sub-divisional Officers call the principal men together and get them to combine and carry out this work.

95. Q. As regards the privileged rates of rent; that so far has acted as a stimulus in inducing the people to terrace their lands?—Yes.

96. Q. You proposed to extend that system to *ahars*?—Something analogous to that system.

97. Q. We have something similar in the Madras Presidency, but there a condition is attached that if the works are not maintained in proper order, the concession is liable to be withdrawn. Would you adopt that system here?—No. That implies that somebody should go round, which generally ends in eight annas or a rupee being taken and a lot of other evils. If it is not to a man's interest to do this, he goes away and the land is let to another person whose interest it will be to do so.

98. Q. The tenants here have no saleable interest?—No. Well, at present there is nothing against it, except that there is no mention made of the transfer or sale of ready holdings in the Chota Nagpur Landlord and Tenants' Act. Up till quite recently they have not had any right to sell their lands, but the practice is gradually and very slowly creeping in. In the amended Bill that will be introduced in the Council, I understand a provision will be introduced to prohibit the sale of *rayati* holdings altogether. Hitherto this practice has never been recognised by anybody, but by their contact with more highly advanced races the people are gradually coming to imbibed the idea that they have a right to sell their holdings, which is not good for them, because they are very thriftless and reckless.

99. Q. Mr. Twiddell, in answer to question No. 10, says that "an irrigation cess like an embankment cess might be imposed to provide funds for the construction and maintenance of tanks and *pains*". Do you approve of that proposal?—No.

100. Q. (Mr. Allen.)—You know the Saran District well?—Yes.

101. Q. For how long?—2½ years.

102. Q. How long ago was that?—I left it in the middle of 1896.

103. Q. A good deal of evidence has been given before the Commission as to the advisability of improving what are known as the Saran Canals and recouping the expenditure involved by imposing a water cess on the district as a whole. What would be your opinion?—It would be quite unfair, because the bulk of the lands in Saran would never get any benefit from the water, and to assess them because of the improvements made in these canals would be quite unfair. The district is shaped like this (witness explained how the district was shaped on the map and also how it would be impossible for the lands he referred to getting a pico worth of benefit out of any improvements that would be made). Continuing witness said—You have spent seven lakhs of rupees on these canals and nothing has been done, and if you spend another seven or twelve lakhs, nothing will be done, and you will be spending good money after bad. The year before last I was Revenue Secretary and the point came up about the opening of these canals. The District Board, the Collector and the Commissioner wrote down to Government to pass orders to have these opened. Mr. Buckley was then Secretary to the Government in the Public Works Department. He drew up a very good note showing how much had been lost in the past; but then the pressure was too great and the order was passed to open them and then what was the result—4,000 acres only were irrigated.

104. Q. It was also suggested that the water level would rise and so wells in other parts of the district would benefit also?—That is very doubtful. If the water level rises, it would mean more malaria. If you have a water level very close to the top of the district, it means a malarious district.

145. Q. (Sir Thomas Higham.)—What is your opinion about these canals?—What do you think is wanted?—Nothing.

106. Q. (The President.)—The argument was that the silt clearance was not properly regulated and that the water when it was given came too late to be of any use, and that the canals only wanted to be put under proper agency?—If the people of the district believe that, why do not their own District Board take it up.

107. Q. The District Board advocated it?—But they don't advocate the spending of their own money.

108. Q. (Mr. Muir-Mackenzie.)—They said the district would be willing to pay?—It has not been levied yet. Those men who said so were not speaking on behalf of the *rayats*. I don't think you would find that the *rayats* would agree to pay an extra cess.

109. Q. (Sir Thomas Higham.)—They send water down here (indicates on map); don't they?—It is not of much use. The people who get most benefit from this water here are the factories.

110. Q. A good many people get benefit from the factories, because the factories are alongside of that nullah?—Yes, there used to be factories. There are deserted factories along there now.

111. Q. (The President.)—But there was much absolute unanimity of opinion from the Commissioner downwards that this place would have its salvation worked out?—If they are so unanimous about it, they ought to urge the District Board to find the money required and look after the scheme. Then you will find they won't burden themselves with it.

112. Q. (Mr. Allen.)—About this Encumbered Estates Act you say about one-third of the division is under Government administration?—More than one-third. One-third is under the Encumbered Estates Act.

113. Q. Do you consider that sufficient money is spent on improvements in these estates?—No.

114. Q. What is done?—There is no working plan; no system whatever, and everything is subordinated to paying off debts; whereas under the law (section 4) improvements come before paying off debts.

115. Q. What you think should be done?—I think myself that when a scheme is sent up to the Board for approval, it should be made subject to revision or report of the Collector or Deputy Commissioner when he knows the tract and is in a position to say how much is required for improvements. It is said in the Act that application shall not ordinarily be submitted by the Commissioner without the consent of the Lieutenant-Governor unless the debts can be liquidated in 15 years, and that "ordinarily" is generally not read, so that no scheme is sent up unless it is made out that the debts can be liquidated in 15 years. Therefore everything is subordinated to the liquidation of debts, whereas the law says the cost for improvements should come before the liquidation of debts. Therefore there should not be any great stress laid upon the length of time for which the estate should be retained under Government management, and the scheme should be accepted subject to the possibility of its being revised when the Deputy Commissioner knows actually the needs as regards improvements for that particular estate.

116. Q. (Mr. Muir-Mackenzie.)—I understood you to say that even on estates managed by Government you would prefer that the improvements should be made by the tenants?—Yes, if you can get it done by the tenants. You could not get it done now. For instance, as I said just now, there is a want of combination among the tenantry, and then of course you will have several cases in which the works are too big for them to carry out. If you choose to wait years and years, then the *rayats* themselves may do it; but if you don't care to do that, either Government must step forward in Government estates, or Government must take the place of the proprietor in carrying out the improvements in the encumbered estates. There was a case came up the other day of a very big *ahar*—an old one which had cost Rs. 4,000, and you could not get the *rayats* to combine to take the silt out of it unless you reduced their rents. Similarly, there are very many other *ahars* silted up, which you could not expect the *rayats* to attend to but the zamindars. I am having them included in the famine works programme, so that when any famine comes, they shall be taken up as famine works.

117. Q. Is it the case that a great number of estates in this division come at one time or another under the Encumbered Estates Act?—Yes, or under Government management. You have got 41 or 45 per cent. of this division now in Government hands, and there is another big estate coming in shortly that will increase it more. In this division ½ of the estates are in Government hands.

118. Q. If a more liberal policy is pursued in carrying out improvements in these encumbered estates, a great deal of good will be done?—Yes. As matters stand, the only good, as far as I can see, that is done by the Encumbered Estates Act, is to prevent the people coming into the hands of alien landlords and to pay off the creditors. There are many cases in which estates after being released have again been taken under the Act in a few years time. Proprietors during the time the estate is being managed surreptitiously borrow money at heavy interest and on the estate being released confirm all their engagements with the result that they are swamped and then apply again to Government to be taken back under the Act.

119. Q. (The President.)—This is a policy for the protection of insolvent landlords?—It saves the people mainly.

120. Q. (Mr. Muir-Mackenzie.)—On the Government estates if the enhanced rents are maintained, is it not surely the duty of Government to repair these estates?—That is now being done; efforts are now being made to keep them in repair, but it is not the duty of Government to repair rat-holes. If at present there is a rat-hole in a *bund*, the people do not try to close it, and so by degrees it enlarges, and if nothing is done, it gets bigger and bigger till finally the *bund* is destroyed. The *mahto's* business will be to see that the *rayats* carry out at their own cost petty repairs like that. Big repairs will be done by Government.

121. Q. Is it not necessary for the *mahto* to have at his back any compulsory provision?—No. A man would not be appointed as *mahto* if he had not enough moral force or power behind him to command the *rayats*.

Mr. F. A.
Slacke.

3 Nov. 02.

NINTH DAY.

Calcutta, 6th November 1902.

WITNESS No. 60.—RAI DURGA CHARAN CHAKRAVARTI, Honorary Assistant Engineer, Edilpore, Bardwan.

(Replies to printed questions.)

A.—GENERAL.

1. Bardwan and Hooghly districts commanded by the Eden Canal. I am in charge of the Edilpar Irrigation and Revenue Sub-division since last four years.

2. The monthly average rainfall statement of the year 1900-1901 is given below :—

Month.	Average rainfall of two canal stations, one in the Bardwan district and the other in the Hooghly district.
April 1900	3.12
May "	4.99
June "	8.80
July "	9.56
August "	11.20
September "	21.93
October "	0.60
November "	0.00
December "	0.20
January 1901	1.18
February "	2.27
March "	0.04
Total	63.89

3.

(1) No.

(2) No.

(3) No.

(4) No.

(5) Yes. The supply generally fails in October and November, when the canal water is most needed, there being no *pucca* anicut across the river Damodar from which the supply is received.

(7) No.

(8) No.

(9) No.

6. No.

There is a strong desire evinced among the people to have means of irrigation extended.

C.—CANALS OF INTERMITTENT FLOW.

12.

(1) There are two sluices in the Damodar left embankment through which Damodar water is sent down to the *Banka nals* by two channels. The *Banka* river is provided with an anicut and head sluice through which water is admitted into the Eden Canal.

(2) There are two distributaries and some *nadis* which are fed by the Eden Canal. In the distributaries there are regulators and permanent outlets through which water is distributed to the land.

(3)

(a) From 15th June to 15th November.

(b) From 1st July to 30th October.

(c) From 1st July to 30th September, *i.e.*, as long as the water level in the river is sufficiently high to supply water into the canal.

13.

(1) The irrigation increases the value of the produce of the land by increasing the yield.

(3)

(a) By increasing the yield one-and-a-half times (*vide* Form No. 74 S. W., 1899-1900).

(b) By increasing the yield doubly (*vide* Form No. 74 S. W. of 1900-1901).

14.

(2) By the too early cessation of the supply, quarter of the value of the irrigation is diminished.

16.

(1) Approximate estimate of the increase in the total annual value of the produce is Rs. 17 per acre.

17.

(1) Annas fifteen and pies one-and-a-half on the area ordinarily irrigated.

(2) *Nil*.

(3) *Nil*.

18. The only private expenditure necessary to bring the water to the field is by constructing village channels; it is generally incurred by the tenant, and he has no security for recompense. Unfortunately there are few village channels.

19. No damage resulted to the people, nor deterioration to the soil from irrigation from any cause. Rather, the alluvium carried by Damodar water has improved the quality of soil of the tract irrigated by the Eden Canal. Eden Canal system serves the purpose of irrigation as well as drainage of the land irrigated from it.

20. Annual maintenance estimate for repairs and silt-clearance, etc., is sanctioned by Government. The approximate annual cost per acre irrigated is one rupee, exclusive of cost of establishment and tools and plant. The system is not working fairly well, and new legislation is required binding on the individual cultivators to pay water-rate and appointing a special certificate officer for the Eden Canal (*vide* Revenue report, page 80, of Eden Canal for 1899-1900).

21. No.

22. No.

Rai Durga
Charan
Chakravarti.

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Rai Durga
Charan
Chakravarti.

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1. Q. (The President).—Have you been a long time in Irrigation?—Yes, nearly sixteen years.

2. Q. Do you know the Burdwan and Hooghly Districts very well?—Yes.

3. Q. How long have you been connected with them?—Five years.

4. Q. Then you are now in charge of the irrigation?—Yes, the Eden Canal.

5. Q. You said in reply to question No. 6 there is a strong desire among the people to have works of irrigation extended?—Yes.

6. Q. To what extent is this desire strong? I suppose they are ready to pay for it?—Yes. They are ready to pay.

7. Q. How much do they pay for irrigation by the Eden Canal?—They pay at present various rates; they have long leases, season leases and flushings. For long leases they pay 5 annas for a *bigha*.

8. Q. (Sir Thomas Higham).—What do you call a *bigha*?—There are 3 *bighas* to the acre, or, to be more precise, 3,025 *bighas* represent an acre.

9. Q. That is almost a rupee an acre?—Yes.

10. Q. (The President).—That is for long leases?—Yes.

11. Q. And for season leases?—For season leases they pay eight annas per *bigha*, and for one flushing they pay four annas per *bigha*.

12. Q. For long leases they get water as long as the canal is running?—As long as the crop is ripening.

13. Q. After the crop is ripe, do they get a second supply?—For this they make separate agreements.

14. Q. What is the rate for *rabi*?—One rupee per *bigha*; that is, three rupees per acre.

15. Q. Does any person take it at that rate?—Yes.

16. Q. Then why do they not pay more for the *khari*?—

17. Q. They take this water every year?—Yes; very generally now-a-days. Every year latterly there has been a deficient rainfall. This year also they had no rainfall in October.

18. Q. Did not the rain fall last month?—Very little; only 1.05 in the whole of the month of October.

19. Q. You do not seem to increase irrigation in the Eden Canal?—It cannot be increased, because there is no regularity in supply from the river Damuda.

20. Q. Do you get the full duty on the water?—Yes.

21. Q. Is all the water used every year?—Yes. The difficulty is there being no weir; the supply in October is reduced very considerably; we have at present 26,000 acres, and this at the duty of 80 acres requires 325 cubic feet of water per second. There is no hope of development. The average supply during last October was 85 cubic feet per second. I have got a statement which I have prepared for the inspection of the Commission.

22. Q. How are these taken?—From the sluices by means of the sluice formula.

23. Q. (Sir Thomas Higham).—How much water have you to supply?—There are 26,000 long leases in force.

24. Q. (The President).—You say you have regulators in the distributaries?—Yes.

25. Q. And you work these regulators entirely for the sake of irrigation?—Yes.

26. Q. Was not the canal made as a sanitary work?—Yes; the first object of the Eden Canal was to supply drinking water; afterwards, when the canal was re-opened in 1881, the demand for irrigation rose, and from 1882 they are trying to work by means of an open cut. We are finding that gradually the main entrance to the channel is being silted up and the supply entering the canal is failing, so the supply is very limited, and therefore satisfactory irrigation is not going on.

27. Q. Which has the first claim, the Sanitary Department or the Irrigation Department?—The object of the canal was to make it a sanitary canal, but we cannot do that; we have already undertaken some long leases, and we are bound to supply water.

28. Q. I cannot understand how you can take long leases?—That I cannot answer.

29. Q. Since how long have these long leases been given?—Since 1892.

30. Q. For the last ten years?—Yes.

31. Q. Has there never been any complaint from the Sanitary Department?—No; we are trying to supply whenever possible for drinking purposes.

32. Q. Your long leases are at 15 annas per acre?—Yes.

33. Q. I see Mr. Macnechy calculated on having long leases at Rs. 1-8 per acre?—Yes, that is the view of the people; they are willing to pay at the higher rate if the supply can be made satisfactory.

34. Q. He estimated that there would be a revenue of Rs. 1,44,000, or for each section only Rs. 28,831?—Yes. That is because there is no weir or regulator.

35. Q. It altogether depends upon the weir?—Yes.

36. Q. The weir will cost about 8 lakhs of rupees?—Yes.

37. Q. Have you ever seen anything like a famine in this district? Have you ever known people dying from want of food?—No.

38. Q. Has it ever been necessary to open relief works?—The material condition of the people is not good. Some relief works were taken in hand.

39. Q. But not for famine?—No, because no death or anything of the sort has taken place in Bengal on account of famine.

40. Q. What is your opinion about a weir? Is it necessary to have this weir across the river?—Yes. I have a little note if I may be allowed to read it. The only solution of the difficulty, in my opinion, is to construct a weir across the Damuda, but I would not recommend it to be constructed at Joojooty, but somewhere higher up near Raniganj and to make a cut nearly 50 miles in length to connect it with the present canal, as the present weir at Joojooty will intensify the evil of the rapid silting up of the entrance channel at Joojooty which is about half a mile long. At present the silt clearance is done by manual labour, but the cost is gradually increasing owing to the increasing head and lift. If a dredger could be employed through the whole length of the channel, the matter could be simplified, but this cannot be done in the present state of the entrance channel at Joojooty.

41. Q. Why not?—Because it is only 50 feet wide at the main entrance and that the dredger will not enter; and, secondly, it is 600 feet long; 600 feet from the sluice. I think it would be much cheaper to build a weir at Raniganj, and there is every probability of the canal water being wanted for irrigation in the tract between Raniganj and Burdwan which is more liable to famine and is drier than the country lower down.

42. Q. Between Raniganj and Burdwan?—Yes. I am not in favour of widening the existing canal and regulators, or the construction of Palashy distributaries, but the canalization of some of the old streams, such as Khoray, Banka, Kousiki, etc., is desirable.

43. Q. Do you think, if these works were carried out, the thing would pay?—It is very difficult to say. Of course I can say it will pay something, but I do not know how it will stand in the long run.

44. Q. The Government may perhaps be willing to make it if it does pay, or if it would amount practically to protection from famine and loss of life, but in a place where famine and loss of life does not occur, I think the Government would say that the people who are going to benefit by the canal should pay and not the whole country?—There are some leading zamindars who are willing to contribute to the cost, as during my own investigations I came to know. There is one man, Bama Charan Bhaer, of Haripal, who is anxious to pay Rs. 16,000 for the restoration of the Kousiki. Babu Amrito Lal Seal, of Satgachia, is willing to contribute Rs. 20,000 for a weir across the Banka; Babu Bipin Bibhary Roy of Dasghara is willing to spend Rs. 10,000 for a regulator in the Kana Nadi.

45. Q. Do you think the people would take water every year?—Yes.

46. Q. Do people in the canal area take *takavi* advances to help their works and improve things?—No. I am not aware of any one doing so.

47. Q. Do they never take it?—No, at least so far as I know.

48. Q. Is there any well irrigation in that country?—No; none.

49. Q. In most years there is enough of water, leaving out the last few years?—Of course there are records. I was there for five years; there was scarcity during those years; there is want in every ten years.

50. Q. Even in years when there is plenty of rainfall would the crops improve if there was irrigation?—Yes.

51. Q. Would the people think so themselves?—Yes.

52. Q. Who makes the village channels?—The villagers themselves.

53. Q. There is no expense to speak of; it is quite cheap, is it not?—Yes.

54. Q. (Sir Thomas Higham.)—What do you say the area of long leases is in the Eden Canal?—26,000 acres.

55. Q. For how many years?—Seven years.

56. Q. Then what area do you get short leases for?—The season leases are for about 3,000 acres.

57. Q. *Kharif* or *rabi*?—*Kharif*. The *rabi* is very little; about 400 acres.

58. Q. Have you done altogether 29,000 acres within the last seven years?—Yes, of which 26 are on long leases and three on short.

59. Q. And the people prefer long leases?—Yes, because the rate is cheap.

60. Q. Since when have you been receiving long leases?—For the last 10 years. I cannot supply them water in October; I find the greatest difficulty to keep them satisfied.

61. Q. Some years ago about 70,000 acres were worked instead of as at present 29,000 acres?—Yes.

62. Q. What is that due to?—Of course I was not in charge of the canal at that time.

63. Q. You must have often wondered at the drop?—I am doubtful whether fully 70,000 acres were irrigated. Another thing is that at that time this was a new irrigation introduced and people were very willing to take advantage of the irrigation and they voluntarily executed the leases without knowing the consequences; that is what I think.

64. Q. Did they get them on long leases or on short season leases?—On long leases. Formerly the long leases were for five years at a very low rate.

65. Q. If they leased 60,000 acres for five years, next year there would be something over that, would there not? but the next year they dropped down to 11,000.—That was the first year. Some of them did not pay.

66. Q. If you could irrigate that quantity, then why cannot you do so now?—I am doubtful whether this area was properly irrigated, because where was the supply to come from?

67. Q. We know how, 20 years ago, you could irrigate 70,000 acres, whereas now you cannot irrigate 30,000?—That was only abnormal. Next year it was only 11,000.

68. Q. You said that you cannot give a lease for more than 26,000?—Yes, and even then not properly.

69. Q. I cannot see how you cannot?—There is a special reason for that; formerly from the entrance of the channel water was carried to the river tanka. From here an ancient has been made and canal has been taken out. Now this Banka was formerly very deep and during the rainy season water used to come in. Now the Banka has silted up, so much so that the water does not enter properly. That was one reason also. I find in 1900-01 I was able to supply 200 cubic feet. In 1901-02 this was reduced to 95 cubic feet per second, and this year it has gone down to 85 cubic feet per second owing to the deterioration of the Banka.

70. Q. These 10 miles to the entrance of the canal, which has silted up, cannot you clear it up?—Yes, but at enormous cost. To clear the block for 1 mile the cost will be Rs. 10,000 or Rs. 11,000; for 10 or 11 miles you can imagine what the cost to clear the Banka would be. In that case the canal would not pay at all.

71. Do you think people will take water to the full extent of the supply?—Yes.

72. Q. How many acres per year?—I think altogether 90,000 acres in October in this district of Burdwan as well as in Hooghly.

73. Q. You said that the irrigation of 69,000 acres has fallen to 30,000 directly they pay water-rate?—Yes.

74. Q. Then why do you think it will increase to 90,000?—At present they cannot get water when they want it. Irrigation is not going on satisfactorily, but if we can make it satisfactory by means of a weir or by means of a proper cut, I think they will all take the water.

75. Q. Then you think that the reason why your irrigation has fallen off is that you cannot get it satisfactorily?—Yes, that is what I think.

76. Q. How many square miles do you command? *Rai Durga*—50,000 acres are commanded at present. We have 200 *Charan* square miles above Burdwan and 800 square miles, near *Chakravarti*, Kanchanagar.

77. Q. How much do you irrigate per square mile? *6 Nov. 02.*—At present I irrigate in 800 square miles only 26,000 acres.

78. Q. That is 30 acres to the square mile?—Yes; something like it. In 800 square miles we irrigate a total of 26,000 acres, so it is about 32 acres to the square mile.

79. Q. That is not a very strong demand for irrigation?—No.

80. Q. If you make this weir, will the canal command more country than it does at present?—Yes, they will take up land and put in new distributaries.

81. Q. Why do you say that legislation is required to bind the individual cultivator to pay water-rate? Do not they pay water-rate when they take leases?—At present the system is this: the leaseholders are bound to pay water-rate and the cultivator is not. Whenever the leaseholders go to the *Oriz*, *Canal*, *river*, *the* *cultivator* *where* *the* *water* *is* *drawn* *from* *the* *river* *the* *leaseholders* *do* *not* *get* *decrees*, because they have not taken any binding agreement from the cultivators. The Munsiffs generally give their decisions against the leaseholders.

82. Q. Cannot they prevent cultivators from taking the water?—They cannot prevent them, because one outlet supplies the water to all the villagers. One cultivator's land may be just in front of the channel, and the others who are willing to pay may have their lands just on the other side.

83. Q. You have no difficulty in recovering from the zamindar?—None.

84. Q. Is it very difficult to recover from the cultivator?—Yes. Those men do not pay regularly and we are obliged to have recourse to the certificate procedure. Leaseholders have no means of putting pressure on tenants, neither have we any means of putting pressure on the people; the last resource is the Public Demands Recovery Act.

85. Q. Cannot they increase the rent of the cultivators?—No, because the landlord himself has done nothing.

86. Q. Has the district ever suffered from famine?—No, but from information I have collected I know in 1874 there was a famine.

87. Q. Did they have any relief works?—Yes, they had some relief works in 1896-97.

88. Q. Where were you then?—I was in the Behar famine. I was on the Sone Canal. In 1896-97 I was in Muzaffarpur.

89. Q. Do you think it would be better to bring the canal from Raniganj than from a lower place?—Yes.

90. Q. Why?—Because if we make a weir just at Joopty, the present head of the main entrance of the channel will be silted up and dredging arrangements must be made. At present a dredger cannot be worked. Another reason is that the country or tract of country between Raniganj and Burdwan is more liable to famine.

91. Q. The cost of the canal from Raniganj is estimated at from 70 to 40 lakhs; whereas a weir in this other place will only cost ten lakhs, so that the proposal you advocate will be eight times less costly?—My idea is quite different from the one Mr. Macneby has recommended. My idea is simply to make an ancient at Raniganj and to make a channel from Raniganj to join with the Eden Canal. That would reduce the cost. According to my estimate it would cost about 8 lakhs of rupees for the weir, and this 50 miles of canal at Rs. 20,000 per mile, which would be about Rs. 10,00,000 roughly, altogether about Rs. 18 lakhs.

92. Q. You are not at all in favour of having navigation?—No, because it will not pay. Where there is railway competition I don't think it will work satisfactorily. There is very little water in the Damuda and you cannot get more than 1,200 cubic feet in October and November, and with this supply navigation and irrigation will not work properly.

93. Q. One thousand and two hundred cubic feet will be enough?—Yes; at present the Eden Canal cannot carry more than 800 cubic feet.

94. Q. You propose to extend the irrigation of the Eden canal?—Yes; at present, if I can get 800 cubic feet, it can be properly worked, but there is no water and I cannot supply. This is the reason why I am always in trouble.

95. Q. (Mr. Meir-Mackenzie.)—Mr. Horn gives it as his opinion, that in the Burdwan and Hooghly Districts

Rai Durga Charan Chakravarti. the rice crops are never known to fail. Is that the case?—In the high lands it fails sometimes.

96. Q. In lands where approaches are likely to be dammed, has it ever been known to fail?—Not very much. Of course a certain portion sometimes fails.

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97. Q. (*Mr. Bajaratna Mudaliar.*)—You said leaseholders find difficulty in recovering water-rates?—These are representative cultivators. There are no zamindars in many cases.

98. Q. They are headmen?—Yes, they are headmen actually, but some of them have no interest in the land.

99. Q. Then why don't you deal directly with the cultivators?—It would be a very cumbersome process. As far as my experience goes, every individual cultivator's land will severally have to be measured, and every individual's water-rate will have to be collected from them, and in case they do not pay we would have to issue certificates against each individual cultivator. So this would be a very cumbersome process.

100. Q. Your revenue establishment costs Rs. to collect Rs. 28,000; that is, about 45 per cent. ?—But that does not include only the men employed in collection. It also includes those employed in the distribution of water as well as engineering works. Our collection and engineering and distribution in the Eden Canal are all in the hands of one staff. In other canals they have a separate staff for revenue collection and engineering.

101. Q. Well, your average area is less than 30,000 acres; don't you think your present staff would be able to measure, assess and collect also?—Yes, with a little addition. If we have to deal with the individual cultivator, we shall require an additional establishment.

102. Q. What advantage do these landlords derive?—12½ per cent. commission.

103. Q. That does not appear in your revenue accounts?—Yes. The system is when we take the water-rate we take the net amount assessed in the account.

104. Q. If that amount is spent on increased establishment, will it not be sufficient?—There must be the headmen to lead these rayats as in other places. There must be one man to give assistance.

105. Q. Cannot you adopt the block system?—Yes, I am trying to introduce it.

106. Q. That will go a long way to reduce expenditure?—The block system does not reduce expenditure; it prevents unauthorised irrigation.

107. Q. Individual fields in the block can be surveyed once for all?—You must make a man responsible for that. One cultivator must be responsible for the water-rate. That man's name must be taken down, his residence, his father's name, etc.

108. Q. Supposing there is a block of 50 acres, and these 50 acres are held by 5 or 6 men, each man's area will be known, and the holders in the block will apply for long leases?—Individual holders will not do so.

109. Q. Why don't you take leases from them individually?—We have from 300 to 400 men in each village; how many leases will there be?—It will be a most cumbersome process.

110. Q. All the men in the block will apply in one block?—Yes, and there must be a headman.

111. Q. Why is it necessary?—So that he will be able to identify them.

112. Q. Once you carry out the system, no further inspection will be necessary. The landlord will be bound to pay whether he takes the water or not?—When a man's field fails, will he not come in with a complaint that water has not been supplied; then who will make an investigation. So every case will have to be dealt with.

113. Q. Is the difficulty insuperable?—Then in every particular field guards must be introduced; we will have to have a record of each particular field; otherwise in cases where there will be investigations there will be no record to show that a particular plot of land was not supplied with canal water.

114. Q. Won't your canal officers find time to do this?—Yes.

115. Q. What is your present staff?—At present my staff consists of two zilladars and one sub-overseer.

116. Q. Have you upper subordinates?—No; there are also certain special officers.

117. Q. Are there no upper subordinates?—No; in the canal staff there are special officers and temporary zilladars.

118. Q. What addition would you require to your staff?—If we are to deal with individual cultivators, I think we will require considerable addition to our staff.

119. Q. Would the cost be prohibitive?—No, but these things depend upon the supply. Unless you increase the supply you cannot do anything. I think supply should be increased, because at present every year the supply is getting reduced, and it becomes very difficult to keep up the irrigation. Then each zilladar will have to be supplied with two more mohurrirs, and then I shall be able to manage with individual cultivators, so that to this commission at the rate of Rs. 12½ per cent., which comes to about Rs. 3,800, will have to be added, say, Rs. 2,000 a year.

120. Q. That will be a little more than 12½ per cent.?—I wish to reduce it to 3 or 5 per cent. as they allow on the Sonc Canal.

121. Q. Are you in favour of extending the term of the lease?—To more than seven years, no, because even with the seven years we have difficulty. Leaseholders may die; cultivation may change hands. I would not recommend the extension of the lease to more than seven years.

122. Q. Have the cultivators not occupancy rights?—They sell their rights or become poor, or for some reason or another their lands change hands.

123. Q. Such cases may be treated specially and provided for?—Yes.

WITNESS No. 61.—MR. B. FOLEY, C.S., Collector of Burdwan.

Mr. B. Foley. 1. Q. (*The President.*)—Have you been long at Burdwan?—Since May 1899.

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2. Q. You say in reply to question No. 5 that there was famine in Burdwan in 1874 and severe distress not amounting to famine in 1897; do you happen to know what did happen in Burdwan in 1874; were there deaths from famine?—As far as I know there was a great deal of distress in Raniganj; a great many people came in from Bankura; there were a lot of relief works in Raniganj.

3. Q. You don't know how many men there were on famine relief in 1897?—I cannot say definitely, as it was before I went to the district. A few kitchens were opened and there was some relief given by the Burdwan Raj at Burdwan and in several other centres. Of course there was a strong feeling that in 1874 it was somewhat overdone; I mean that it was not so serious as it appeared.

4. Q. Generally speaking of the district, would you say that it is within the famine area of Bengal?—No. I should say it is practically impossible to have famine in Burdwan except under very exceptional circumstances.

5. Q. Such as practically do not exist at present?—I should say so. Except in some small local areas, where the land is poor, famine is impossible.

6. Q. You say at the beginning of your answers that there are Government irrigation works. Is that the Eden Canal?—Yes.

7. Q. Questions concerning that canal come before you?—Yes, occasionally complaints of want of water required.

8. Q. Is it popular? Do people set store upon it?—Yes, people occasionally apply to me and say they cannot get water. This is principally in the month of October.

9. Q. Is it your impression that the irrigation is really popular? Is it a thing that the people are glad to have?—Yes; it is popular.

10. Q. I suppose it is practically all rice?—Yes, rice and a little jute.

11. Q. What is the population of the district?—1,530,000.

12. Q. Has there ever been any proposition for irrigating in Burdwan except from the Damuda river?—No, I don't think so.

13. Q. From what you know of the district, do you suppose people would take irrigation and be willing to pay for it every year?—They would pay a certain amount undoubtedly every year for irrigation, but whether they

would pay enough to make the scheme for increasing the water in the canal is doubtful.

14. Q. Is there any well irrigation?—I have never seen any, but have learnt from the District Engineer that there is a little from small *kachcha* wells near the Damuda in one tract.

15. Q. Now, with regard to shallow reservoirs and tanks, are there many of both?—Yes, a good many.

16. Q. We found out at Gya and elsewhere it was very common thing in those parts where is a slight slope to throw *bunds* across the country and confine the water?—This is not done in Burdwan, as the country, except in Raniganj, does not lend itself to this.

17. Q. (Mr. Allen.)—Your tanks are dug tanks?—Yes nearly everywhere. The other system is in some places used in the Raniganj District.

18. Q. I suppose you have no demand for loans for land improvement?—Yes, there are demands; I have here a statement showing the figures for the past ten years.

19. Q. Do you know what they do with these loans—how they employ the money?—For making tanks mostly.

20. Q. Tanks with the view of irrigation or for drinking purposes?—Irrigation mostly.

21. Q. And these tanks are dug tanks from which water has to be lifted by mechanical means?—Yes.

22. Q. Do they irrigate rice from these tanks?—Yes, mostly from them.

23. Q. That is on a very small scale?—Yes.

24. Q. (Mr. Muir-Mackenzie.)—A great deal of lifting goes on from these tanks?—Yes.

25. Q. (The President.)—You say in reply to question No. 9 “extensive irrigation . . . water may be distributed.” Then you say they are necessary; do you mean they are actually necessary to protect the district from scarcity?—No, I should have said the works would be advantageous or expedient; they are not absolutely necessary.

26. Q. (Mr. Muir-Mackenzie.)—I understand from you that there are a great many tanks all over the country from which they lift water. When is this done?—In October to mature rice; sometimes also for transplanting in July.

27. Q. Never for sowing?—I have not noticed it being done for sowing, but it may be done occasionally for seedling beds. It is done for transplanting and also in October.

28. Q. Do you think as many of these tanks are dug as are required?—I believe that a number of the tanks that were dug for this purpose have silted up.

29. Q. There are no *bunds* across the country?—No.

30. Q. Do you think people will be able to clear out their old tanks or to dig new tanks if advances were given freely?—Yes, to a certain extent. In the present year I have Rs 8,000 to spend in advances. I have received applications that will cover more than that.

31. Q. You think you will be able to dispose of Rs. 8,000?—Yes, easily.

32. Q. Did you ask for more than Rs 8,000?—No, it was allotted.

33. Q. Were you consulted before the allotment was made?—As far as I remember, no.

34. Q. How much do you think you can get rid of in an ordinary year?—In an ordinary year with a good rainfall nothing is wanted.

35. Q. In the present year and last year how much could you have got rid of if you had *carte blanche*?—About double the amount, I believe, in the present year. Making a guess, perhaps the same amount could have been disposed of last year.

36. Q. About Rs. 16,000?—Yes.

37. Q. You could not get rid of half a lakh?—No.

38. Q. (The President.)—In a year of exceptional drought?—I don't think so.

39. Q. You could not dig a tank in that time to utilize it. By the time the tank was dug it would be over?—Yes.

40. Q. (Mr. Muir-Mackenzie.)—I was just coming to that; could not they be induced to make tanks ready in good years to protect themselves in bad years?—Yes.

41. Q. Would not an energetic officer advise them to do so?—Yes.

42. Q. You are confident that it would be of use to them in a bad year?—Yes.

43. Q. How many times would a bad year be likely to come round?—That is very difficult to say. The Burdwan District seems to be getting dry.

44. Q. You are coming through a dry cycle perhaps?—Yes, perhaps the improvement in health and everything else shows that the district is drier than it used to be.

45. Q. Are you quite satisfied as to the persons to whom the advances are given?—There has been no trouble in recovering the sums that have been advanced.

46. Q. Have people any trouble in getting them?—Not on good security.

47. Q. It does not take a long time?—It takes time to make the necessary enquiries.

48. Q. (Mr. Rajaratna Mudaliar.)—The Commissioner of the Burdwan District says in answer to question No 5 that tenants, as a rule, have not got good enough security for Government; do you agree with that view?—Yes, I think I would on the whole.

49. Q. Are they not occupancy tenants in the Burdwan District?—Yes.

50. Q. If they are occupancy tenants, what is the difficulty about security?—I do not know what the Commissioner's reasons were. Perhaps he meant the character of the people; you must absolutely be sure of your security, otherwise they will take advantage of you.

51. Q. You can sell him up under the Loans Act?—For advances, yes. As regards the advances, I have personally seen there has been no difficulty in collecting, but I have always taken good security.

52. Q. What security do you take? Personal security?—The value of the land. The land is pledged as security.

53. Q. If this is not considered sufficient, you can insist upon the applicant for the loan producing other sureties?—Yes.

54. Q. So there is no difficulty as regards security?—Not if the tenant is a substantial man.

55. Q. During the past ten years Rs. 37,416 have been advanced as loans for the construction of 110 tanks. This is given in the statement received from the Bengal Government. Do you happen to know in what condition these tanks are?—No, I cannot say. The loan is advanced and the man makes his tank.

56. Q. How do you find out that the man does make the tank, and does not misappropriate the money?—If he misappropriates the money, there is a certain penalty—a summary procedure provided.

57. Q. Do you realize any revenue under these tanks?—No, I don't think so.

58. Q. Do you know if any additional area has been brought under irrigation in this way?—Some additional area would come under every new tank, I should say.

59. Q. In one of your answers you gave 6,913 acres as being irrigated?—Yes.

60. Q. In the statement received from the Bengal Government 18,872 acres are shown as irrigated from canal works; can you explain the difference?—No, I cannot explain; the figures I gave were supplied me by the District Board.

61. Q. The figures 18,872 are possibly the ten years' average?—Possibly.

62. Q. You said the gross annual crop was 527,000 and odd; the statement given by the Government of Bengal gives 128,000 and odd?—I cannot explain the figures.

63. Q. The Burdwan District apparently requires flood embankments; can you say why the *bund* which existed on the south bank of the Damuda was removed?—I understand it was removed because it was found that the river was silting up. It was therefore decided to remove this embankment and let the water go over a certain area to the south. This was the lesser of two evils.

64. Q. (Mr. Muir-Mackenzie.)—Can you give me any idea of the number of these small tanks; are there two or three, or are there a great many in every village?—I should say there are two or three.

65. Q. Would not wells be the cheaper way of irrigating?—No, I do not think the people care for wells except at Raniganj.

66. Q. How far below the surface of the ground is the water? How high have they to lift the water?—Three or four feet.

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Mr. B. Foley. 67. Q. How big is the tank generally? Does it cover two or three acres?—It is difficult to say; the size of a tank varies very much; generally they are one and a half to two acres.

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68. Q. Have they lifts on all sides of a tank?—Generally one or two.

69. Q. What sort of lifts do they generally use?—A boat-shaped dug-out instrument known as a *donga*.

70. Q. (Mr. Allen.)—Would you say that these tanks are primarily for drinking purposes or for irrigation?—Most of them have been dug for irrigation. One is sometimes dug specially for drinking water. A zamindar or *patnidar* makes one occasionally for the benefit of the people.

WITNESS No. 62.—RAJA BUN BEHARI KAPUR, Burdwan.

Raja Bun Behari Kapur. 1. Q. (The President.)—You are the manager of the Burdwan Raj?—Yes.

2. Q. I suppose you know the whole district very familiarly?—I cannot say I know the whole district very familiarly, but I know it partially.

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3. Q. You say in reply to question No. 5a that there was a partial famine in 1866; famine in 1874, scarcity in some parts of the district in 1885, and severe scarcity not amounting to famine in 1897-98. Do you think it was really a famine?—In 1866 I had nothing to do with the famine myself, but I found out afterwards that the Maharaja of Burdwan spent large sums of money to relieve the distress of the people and that there were famine and scarcity.

4. Q. Do you know how much was spent.—Rs. 60,000, and there was no Government aid opened as far as I am aware. In 1874 the Maharaja opened relief works and I had charge of these relief centres myself. I know that there was famine as well as scarcity and several lives were lost. We endeavoured to save them as much as possible, but it was impossible to save every life.

5. Q. How much did you spend in 1874?—In 1874 we spent money in two ways, and certain sums were spent as subscriptions and certain sums in his own charitable centres. The sum given as subscription was a subscription to the Government.

6. Q. Was it a very large sum?—No, probably about Rs. 25,000 or Rs. 30,000. During the scarcity of 1885 we also opened some relief works and doled out rice, salt, oil and also supplied some fuel for cooking purposes. We also had some kitchens opened in certain places where they were wanted. Similarly in 1897 we had relief centres in two places. In one of them there were some deaths, but it so happened that these were among the people who came from other districts. We had a centre upon the Grand Trunk Road which is used by persons travelling from all districts, as there was scarcity.

7. Q. In reply to question No. 9 as to what general measures should be adopted, you say that there is already a canal in existence in the Burdwan District called Eden Canal, which serves portion of Burdwan and Hooghly Districts?—This should be improved and the excavation and re-excavation should be encouraged.

8. Q. You advocate meeting the deficiency by making a weir. Are you satisfied that the people will take water every year?—They take water every year, but the quantity varies.

9. Q. Are they prepared to pay for it every year?—They have entered into long leases, and they will have to pay whether they take the water or not.

10. Q. Of course a weir over the Damuda would be very expensive. It is estimated to cost over 8 lakhs of rupees. If that was carried out, do you think there would be very large increase every year?—The capacity of the Eden Canal will not allow of a very large increase. I don't particularly advocate a weir; what I say is that some means can be devised to supply more water.

11. Q. But if we supply more water, are you satisfied it will be all taken up?—I have stated that in my answer. At present they have entered into long leases, but they do not get the water. If you are to supply water, you want sufficient water in the canal. At present people enter into long leases with the sole object and idea of depending solely upon the Irrigation Department, and they hope they will get the water as they require it. But the Irrigation Department have been unable to supply water, because facilities don't exist to allow sufficient water to go into the canal. There are many complaints, and probably some of these days these people will be launching suits against the Government for damages.

12. Q. In the meantime will they give up these leases?—I don't think so. Men live in the hopes that if they don't get the water in one year, they may get it in the next four years. I don't think they will give up the leases.

13. Q. You don't think in ordinary years there is enough rain water to get on without irrigation?—If there was sufficient rainfall we could, but we do not get it in the proper time. We do not get rain in the months that we require it and we get more than we want at other time. Moreover, the people like to start their cultivation as early as they can if they can only get the water for irrigation; even to grow their seeds they are willing to take it. (Reads from paper).

14. Q. I don't quite see what the road cess has got to do with it. Of course they don't wish to pay any more if they cannot get any benefit, but if they are going to derive any benefit, they will pay whether rayat or zamindar?—If they get benefit.

15. Q. One spends money with the object of getting advantage?—Yes, but the zamindar also considers whether the rayat will give him any increment on the rent to make him pay.

16. Q. Will the zamindar himself not go to the expense to ensure irrigation?—Generally they are not in a better condition. Unless they combine they won't do it.

17. Q. Is there a great deal of irrigation effected by tanks?—Yes.

18. Q. And in the dry years I suppose these tanks run dry?—They all dry up. I don't mean there is not sufficient water for them to wash their hands and feet; what I mean there is not enough to irrigate in the years of severe drought. These tanks should be divided into three classes—the larger tanks, medium tanks and small tanks. There are several tanks which are used for drinking purposes, and there are tanks which are situated in the centre or border of the fields which are used for irrigation purposes. Then there is a third class of tank which is generally called "Dobas" or "Khirkopukur" which are attached to almost every house in Bengal and are used by native ladies for washing their pots and pans in and washing purposes generally.

19. Q. How much irrigation do you get from any one tank?—That depends upon many things—the size of the tank, the depth of the tank, etc. I am not able to give any opinion, but I know this that each tank can irrigate a large area.

20. Q. About a hundred *bighas*?—More than that.

21. Q. The water is all lifted?—Yes; they either lift it or they cut an embankment to allow the water to run out.

22. Q. Then these tanks are not altogether underground?—They cut embankments only where tanks are situated on a slope, or on higher ground. They also use the bailing system.

23. Q. The people don't use wells?—In this part of the country they do not, but in the Bankura District they do.

24. Q. The Raja has got property in the Bankura District?—Yes, the Raja has got property in 19 districts, but the corpus of the estate lies in these five districts—Burdwan, Bankura, Birbhum, Hooghly and Howrah.

25. Q. In reply to question Nos. 9 and 10 you say, with regard to the obstacles to irrigation works, that the impoverished condition of the country interferes with their extension, but if concessions of the kind granted in 1874, namely, a remission of one-third of the sum advanced, are allowed every year, zamindars and tenants, both alike, might be induced to excavate and re-excavate irrigation tanks and wells; you can hardly expect the Government to do that?—Yes, I do, and for this reason that when there is a famine the Government do not hesitate to spend huge sums of money. Then why not spend money and take this precaution of prevention. A few recommendations which have struck me I have put together. In my note some amount of money should be allotted every year and some new tanks should be excavated for the purpose of storing water.

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26. Q. Do you think that the district funds should pay for this?—I stated in my paper that it should come out of the State, Imperial or Provincial Funds. In former times there were Badshahi tanks during the period of the Hindu Rajas and Mahomedan dynasties when there were numerous tanks all over the country principally excavated at the cost of the State for the supply of water for drinking and irrigation purposes.
27. Q. (Sir Thomas Higham).—People take long leases in order that when critical times come they will get water, but at such times they do not get water?—Yes.
28. Q. Why do they go on taking long leases?—Because they are hoping to get water. If any one takes a long lease, he pays five annas per *bigha* or one rupee per acre. If he takes a season lease, he will have to pay more. People like to be sure that they will get water for five years at a cheap rate, because at present the rainfall is becoming scantier year by year.
29. Q. But they do not have to pay for a year in which there is plenty?—They will save on that year, it is true; but when he is in need of water he might not get it, and to avoid the disappointment he wants to be assured of his getting it. That is the reason he wants long leases, but he takes a lease for five years and ensures getting the water for that period.
30. Q. When the water-supply fails, as it has this year, is there any remission of the water-rate?—No, not that I know of.
31. Q. Should it be given?—My own opinion is they should get a remission. They get sufficient water, whose lands are close. These have the advantage of getting it first. Those farther off get it last, so that the tenants fight at the time as to who will get the water first. The men would pay even 8 annas per *bigha*, or Rs. 1-8 per acre if they were sure of getting the water in time.
32. Q. Have you seen the opinion sent in by Raja Peary Mohun Mukerji. He does not hold the same view as you do?—Opinions differ. His opinion is not mine.
33. Q. But these people regard it as a great hardship that they have to pay an annual charge for water?—I think the Irrigation Department will be able to satisfy you that he himself wants water for irrigation.
34. Q. They want it in seasons of drought?—Of course there is always a black and a bright side in everything. If we take a long lease in good years, we do not want the water, but we must pay for it. I have seen Raja Peary Mohun Mukerji's view, but I do not agree with it altogether.
35. Q. With regard to the difficulty that owners are said to have in recovering water-rates from their tenants. When owners take long leases do they find any difficulty in recovering water-rates from their tenants?—Yes, there are some difficulties. I have taken a lease for five of my Khas Mahals and I paid the money first, but my difficulty is to realise from my tenants.
36. Q. Why do not the tenants pay?—Tenants will gladly pay if they are sure of getting water.
37. Q. When they get good crops will they pay?—Yes; last year they have suffered and this year they are going to suffer again.
38. Q. If the supply is good and there is a good crop, there is no difficulty between landlord and tenant?—But please remember the landlord has difficulties in realising either rent or water-rate. He has not your cheap means of realising. His difficulties remain the same whether it is a good year or a bad year. Some tenants will not keep back a farthing, but the majority will not follow that rule.
39. Q. If they get a good crop, they do not make a fuss?—The chances are that they will pay. We cannot eject a troublesome tenant and cannot remove his name from the lease, and will have to suffer for the full five years.
40. Q. Are season leases applied for by the zamindars or the tenants?—In some cases by zamindars and chiefly by a combination of tenants. No leases are granted to individual persons unless they are men of substance. Generally 5, 10 or 12 tenants have to join together to get a lease.
41. Q. What is the size of a block?—It differs very much.
42. Q. I think it is in the hands of the Sub-divisional Officer?—Chiefly.
43. Q. Do you think a great deal can be done by keeping tanks in order?—Yes, I think so. I have advocated that.
44. Q. How long does it take for a tank to silt up?—It all depends. If properly dug, it may not silt up for 25 or 30 years, and it does not require any annual cost of upkeep.
45. Q. When a tank is silted up what is the best thing to do; clean it out again, or build a new one?—It is cheaper, much cheaper, to clean it out.
46. Q. When the tank is filled up the bed is very good for cultivation?—That is quite possible; some old tank beds are so used; but people generally re-excavate old tanks in preference to making new ones. Moreover, most of those old tanks, which were made ages ago, are on the best sites which command the fields and are very suitable for sending down the water for irrigation purposes.
47. Q. When people clear out tanks do they use the silt for their fields?—Yes, in small quantities. It benefits very much if any one undertakes the cost, but very few people care to do so.
48. Q. When you clear a tank will the people come and remove the silt for the purpose of improving their fields?—Yes, sometimes, but you have to pay for the labor and this is a deterrent: as a general rule, when we dig tanks, we take up the silt and put it on the embankment, and this being very good soil, we grow plantains and pumpkins in these places.
49. Q. I suppose the tanks want clearing out once in every four or five years?—No, once in 20 or 25 years; they are never excavated before 20 or 25 years.
50. Q. It takes 20 or 25 years to silt right up; you could clear it out when it has got only a foot of silt?—We do not do that; it is very expensive. We usually wait until it has lost the capacity of holding fresh water for irrigation; that is our criterion.
51. Q. Does it not often happen that there are men who wish to make a tank, but cannot make it because they cannot get the land for it?—In some villages that may be the case; sometimes it happens that a man has got money, but has not got the land. Some have land and have not money.
52. Q. A man has to get the permission of the landlord to dig a tank?—Yes.
53. Q. But is not the landlord always very willing to give permission?—That depends upon who the landlord is. Sometimes a landlord will be very glad to give up land for a tank, and sometimes he will not. It all depends upon the particular person.
54. Q. Can nothing be done to facilitate the acquisition of land for private owners?—Private owners cannot acquire the land. It is only Government who can acquire; I don't think Government can acquire for private owners.
55. Q. Do you think it would be advantageous for Government to acquire it?—Yes; if anyone wants to make a tank and does not get the land, it would be much better for Government to acquire the land and make it over.
56. Q. Of course that would require an amendment of the present Land Acquisition Act?—Probably it would; but I am not sure whether the present Act would not cover it.
57. Q. Do you think it would be a good thing for Government to do that?—Yes.
58. Q. If a man applied to the Collector, stating that he wanted lands to make a tank, would he get him the land for it?—Yes, probably he could.
59. Q. (Mr. Muir-Mackenzie).—What kind of work did you give relief labourers?—Chiefly digging out tanks.
60. Q. If tanks are so useful for irrigation, why did not you employ them for irrigation?—We are very peculiarly situated; we have leased our land in perpetuity; we have no direct management, and unless we have direct management we do not spend money on irrigation.
61. Q. (Mr. Rajaratna Mudaliar).—Would it not pay to construct irrigation works and get enhanced rent?—Well, there is a system in vogue in the Raj called the *putni* system. The Government has settled the land in perpetuity under the "Permanent Settlement Act," and the zamindar in his turn has leased out the property under a lease called *putni*, and as these are settled in perpetuity, we cannot raise the rent by a single pice.
62. Q. Surely you can by providing irrigation to non-irrigated lands?—We cannot do so unless we are asked by *putnidars* to do so. Generally the *putnidars* do not want us to interfere in any way. We would be only too glad if they came forward and asked us. Within the last 17 years of the Court of Ward's management I do not know of a single instance of *putnidar* coming forward to make such a request.

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63. Q. It may be due to ignorance?—I cannot say that, in every village there are generally one or two educated men, who will give them instructions; of course in the interior this may be true, but it cannot be said that the people in the Hooghly and Howrah Districts are ignorant; they are all educated persons. I mean they know their rights very well, especially they all understand something of the law.

64. Q. Do you offer any encouragement to the tenants to construct tanks?—Yes, if it is on the property under our direct management, you must divide between such properties and those on *putni* leases. As regards our *putnidars*, we don't encourage anything. The *putnidar* has a number of tenants under him, and he has power to take an enhanced rent from them.

65. Q. Have they power to enhance rent?—Yes; they do but under the present law how far they have power to enhance I do not know.

66. Q. Does the Bengal Tenancy Act apply to your land?—Yes. These middle-men know how to go about enhancing rent. For instance, a *putnidar* who pays Rs. 2,000 has an annual profit of Rs. 12,000. I am not complaining. I like to see that my tenants are rich, but I only say this to show that they can enhance rent while we cannot increase a farthing. Under these circumstances you cannot ask us to spend money on irrigation to benefit them while we get nothing. I think that a remission of one-third of the loan should be given as in 1897 as an encouragement to the people to take land and excavate tanks.

67. Q. Do you think that will be fair to the general taxpayer?—Strictly speaking, I don't think it will be unfair; you have to spend vast sums, then why not spend some money for preventive works? The zamindar is also a taxpayer, and when you had famine we also subscribed.

68. Q. This is private generosity?—Then this would be State generosity. The State ought to be more generous than private zamindars.

69. Q. How much money has the State spent in this way during the last ten years?—I can't say exactly.

70. Q. Suppose the State remits the interest only?—We remit interest on the sum advanced. The State ought to do something more.

71. Q. Is it a very large sum?—Hitherto the practice has been to spend only in years of scarcity. Advances should be made now in ordinary seasons. You have just now heard the Collector say that he advanced only Rs. 1,500 or 2,000 annually, which is a very small sum; we ourselves spend more than that annually; this year we have spent Rs. 12,000. I have advocated that advances should be made in each year to safeguard against famine.

72. Q. Do you give these advances to tenants or *putnidars*?—As I mentioned just now, I don't give a pie to the *putnidars*. It is only to the tenants of the estates that are directly under my management. I am not going to pay a pie for his benefit unless he asks. If he spends 12 annas and asks me to give him 4 annas, I will be very glad to do it.

73. Q. (Mr. Allen.)—Can you tell what a tank costs to make?—It depends upon the size.

74. Q. Say one about 3 *bighas*?—About two thousand rupees, but even here it all depends upon the depth and nature of the soil. If it is hard soil, it will cost more. If you meet with a spring suddenly, the cost of bailing out the water will be great; generally for a tank of about three *bighas*, Rs. 1,500 to Rs. 2,000 will be quite sufficient.

75. Q. Is the excavation of a silted tank an expensive matter? What will it cost to excavate a fully silted tank of that size?—Say half the amount. There also it will depend upon how much it has silted up, because some tanks have silted up so much that they have been turned into paddy fields. If it is 3/4ths silted up, the cost will be in proportion.

76. Q. You spoke about the advisability of the Government giving up 1/3rd of the *takavi* loan as a premium against famine. I suppose the famine expenditure in Burdwan since 1892 has been very little?—Very little. Burdwan has been fortunate in that respect; if there is no famine, I don't want anything.

77. Q. What measure do you adopt? Do you take long leases from your tenants?—I don't take any leases from them. I simply write the name of the tenant and make it over to the *gomasta* to realise from him. First of all they must send in a petition, then I take action.

78. Q. Have you been certifying these amounts as due?—In such cases where I was forced to I collected by suits.

79. Q. Is it the practice in Burdwan to charge a tenant *salami* if he makes a tank?—It all depends upon the nature and habit of the landlord; we never do it; some landlords no doubt do so.

80. Q. Do not some landlords object to tanks being dug?—If it is for irrigation purposes, I don't think he will object.

81. Q. As a matter of fact, rent is not charged for tanks?—Some rent is charged.

82. Q. How would the rent of a tank compare with rice land?—Supposing there is a tank of 4 *bighas*, we charge only 4 annas simply to have a nominal rent, just to differentiate between rent-free and rent-paying land.

83. Q. What would the charge be for the same area under rice?—It would depend upon the lay of the land. Generally speaking, it would be about two rupees per *bigha*.

84. Q. You told Sir Thomas Higham that the land should be acquired under the Land Acquisition Act. Under that Act the owner gets 15 per cent. over the market value: would not the *rayat* find that expensive?—Yes, but if he wants the tank, he must pay for it.

85. Q. Still he would have to pay 15 per cent. over the market value?—There is no help for that; if he is desirous of having the tank, he must pay.

86. Q. (Mr. Muir-Mackenzie.)—You said you give advances; what do you give them for?—I give some for the improvement of their tanks and chiefly for buying seedlings and supplying themselves with implements for cultivation.

87. Q. Very little for improving tanks?—Whatever they ask for.

88. Q. They don't ask for much?—No.

89. Q. Do you think then that, if there is plenty of money made available, they would ask?—I am sure of it, because the *takavi* advances, as I have already said, are generally made in years of scarcity. If the people are told that they can have money from the Collector or District Board, as I have stated in my note, you will make them advances, and give up one-third or whatever proportion may please Government, the chances are that the majority will come forward and take advances every year.

90. Q. (Mr. Allen.)—You spoke of an area of 100 *bighas* being irrigated by one tank; what sort of tank?—A tank of one or two acres would irrigate about 300 *bighas*.

WITNESS No. 63.—BABU HARI DAS PAL, District Engineer, Burdwan.

Babu Hari
Das Pal.

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1. Q. (The President.)—You are District Engineer of Burdwan?—Yes.

2. Q. How long have you been there?—Nearly 11 years; since 1892.

3. Q. During that time have you seen many bad years?—I have seen two years of scarcity; a partial famine in 1893 and some scarcity in 1898.

4. Q. Do you think there was anything you could really call it a famine?—No.

5. Q. Had you relief works?—We did have relief works. They were not huge. We opened relief works to excavate tanks, and did some village road-making to relieve the villagers in these parts.

6. Q. In your statement which we have only just got this morning and have not had time to see through, you say that the area irrigated by private irrigation works, such as wells and tanks, is about 12,000 acres?—My idea is that, of the total area, about one per cent. of the land is commanded by village tanks. In years of drought these tanks are not full.

7. Q. Do they get any benefit still from them?—Yes, a little.

8. Q. There must be a great number of tanks?—Yes, there are a great number in each village in the cultivated area.

9. Q. Do each of these tanks irrigate a larger area than itself?—Yes. Many of these *rayats* have the right to

irrigate their field from certain tanks, but in years of drought they do not get the full benefit.

10. Q. Do you think that a tank will irrigate five times its area?—I am not quite sure of that.

11. Q. Have you seen anything of the irrigation in the Eden Canal?—Yes, I have gone about the district and seen what is being done.

12. Q. Is the irrigation in the Eden Canal very valuable to the district?—Yes, it is very valuable. It is much valued by the *rayats*.

13. Q. Do you think that it should be enlarged, and if it was enlarged, would more land be irrigated?—If the supply was increased, it would command a larger area than it does at present.

14. Q. They pay per acre for irrigating?—Yes, most of it is by lease.

15. Q. Then I suppose they take water whether they want it very much or not, because they have to pay for it?—Yes.

16. Q. Do they make complaints about paying for leases and not get water?—Yes.

17. Q. Are the complaints well-founded?—Yes, in most cases.

18. Q. You say in reply to question No. 9 (the question being as to what general measures should be adopted) you recommended extensive irrigation works as necessary; are they to be undertaken by the Government or District Board, or both?—Under the Act the District Board is not allowed to do any irrigation work. Until the Act is amended they cannot undertake such work.

19. Q. Are you a member?—I am not a member. I am the engineer.

20. Q. Do you think that the Board would like to have the power and would they use it?—Yes, I think they would like to have it, because this is a sort of local work and they would like to get benefit.

21. Q. They would want more money?—Certainly. My idea is that there are certain acres that are more liable to famines than others. A list of the tanks in those areas might be made and a list of tanks silted up. An order might be passed that a register should be kept of such tanks and the owners might be asked to re-excavate them out of their own funds; and if they complain of want of funds they may be asked to take advances from the Government under the Agriculturists Loans Act; and if they decline to do it, such tanks may be acquired by the Government and re-excavated. Then the *rayats* may be charged a water-rate. This may be one source of income which may be placed in the hands of the District Board. I think they would be willing to pay. I think they would pay something like 8 annas a *bigha*.

22. Q. (Mr. Muir-Mackenzie.)—The men who got the water?—Yes.

23. Q. Has anybody else to pay?—No; it will not be a general rate.

24. Q. Have you any experience of well-irrigation?—I have seen only some *kachcha* wells in the district which are used for irrigating only vegetables and pulse.

25. Q. The people prefer tanks?—Yes.

26. Q. For digging tanks do they take *takavi* advances now?—In some cases not much.

27. Q. Why do they not take them freely?—Probably the system is rather complicated. They have got to apply; then some officer is deputed to enquire whether it is worth giving him the money, whether the security offered is sufficient, etc.

28. Q. Do you think if the system was made easy, they would take advances more freely?—Yes, I think so.

29. Q. Do they complain of the rate of interest?—No. I never heard of such complaint.

30. Q. You say the system is very complicated?—It is not easy to get access to the Collector and to get advances under that system.

31. Q. (Sir Thomas Higham.)—Do you think a great deal can be done by re-excavating old village tanks?—Yes.

32. Q. Where is the money to come from?—From the Provincial Revenue.

33. Q. Have you any idea how much water is required for flooding an acre of land?—Something like 14,000 cubic feet for a depth of four inches.

34. Q. What will it cost you to remove that 14,000 cubic feet of silt out?—Rs. 75.

35. Q. Then you must pay Rs. 75 for getting storage for one acre?—Yes.

36. Q. How can they afford to pay water-rate and interest on that? Do you mean to say that the people would pay interest on that? What will the interest on Rs. 75 come to?—It will be about Rs. 3 whether they want the water or not.

37. Q. I don't see how they are going to borrow the money and pay interest?—If the villagers agree to pay, of course, they would.

38. Q. They cannot pay Rs. 3 an acre for cleaning out the tanks?—That is too much. Probably they would be willing to pay 8 annas a *bigha* or Rs. 1-8 an acre, the balance Rs. 1-8 being borne by Government.

39. Q. Then the remainder will have to be paid for from some other source—by Government or by somebody else?—Yes.

40. Q. Is there any cleaning out done in the old tanks?—Yes, but not much. We see now and then one or two tanks cleaned up.

41. Q. By the zamindar?—No, not zamindars, the owners of tanks.

42. Q. Do they take the silt for manuring purposes?—They do.

43. Q. How far?—They carry by carts to their fields.

44. Q. Do they carry it a mile?—Yes, that they do.

45. Q. (Mr. Muir-Mackenzie.)—How much money do District Boards spend on these works in years of scarcity?—About ten or twelve thousand rupees.

46. Q. If the District Boards had been spending that amount of money upon the improvement of tanks, or in making new tanks, all this expenditure or a material part of it in the famine year would have been saved?—It is again not certain whether a famine would occur in the same place in case of drought; that is the principal thing.

47. Q. Would you find it easy to select many sites for new tanks?—Plenty of sites. I do not know whether owners would give the lands free of cost, or whether they would have to be acquired.

48. Q. Most of them are occupied by old tanks?—Not all.

49. Q. How is the irrigation brought, by lifts?—Yes, sometimes one to three.

50. Q. How high is the lift?—Three to four feet.

51. Q. You must have to lift nine or ten feet by successive lifts?—Yes.

52. Q. (The President.)—For rice irrigation?—Yes.

53. Q. (Mr. Muir-Mackenzie.)—That is not done throughout the whole season?—No.

54. Q. Only when the crop is in a critical condition?—Yes.

55. Q. Mr. Horn has said that in this district of Burdwan rice has never been known to fail entirely; is that true?—Of course there are certain years that are worse to some crops. There is no regular failure over the district. There may be a partial failure.

56. Q. What is the lowest crop you have ever known in the district?—I think the average is 8 annas.

57. Q. (Mr. Rajaratna Mudaliar.)—With regard to existing tanks, cultivators pay a rate which includes a certain charge for water?—I do not know whether they pay any rate, but they have a right to water from some village tanks.

58. Q. They pay rent which may be presumed to include it?—Yes, these rates have been fixed many years ago.

59. Q. Do you think they can justly be called upon to pay a higher rate if an old work is restored?—Yes, but I do not know whether they will agree in every case.

60. Q. Would it be fair; they are entitled to water and hold the land at a certain rent?—Yes.

61. Q. If a tank was silted up and the owners did not clear it, could the tenants sue the owners?—I do not know. I have never heard of such suits.

62. Q. You said the District Board spends ten or twelve thousand rupees on certain works. They are not for irrigation works?—They sometimes use it for irrigation works.

63. Q. But they have no power to spend money on irrigation?—They meant it for drinking-water, but the *rayats* use it for irrigation and the Board cannot prevent it.

WITNES, No. 64—BABU MAHANANDA GUPTA, Deputy Collector, 24-Parganas.

Notes on Irrigation Works.

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Mahananda
Gupta.

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Drainage Works.—Three drainage schemes, viz., (1) Rajapur, (2) Barajala, (3) Howrah, have been carried out within the Howrah District under the Bengal Drainage Act (Act VI of 1880 B.C.) besides the Dankuni project which was the first that was taken up in the Hughli District under a previous Act. All these schemes have proved successful, as all the waste swamp lands within their basins have been reclaimed and the other lands improved. Both the drainage and the irrigation of the land are effected by these works. Properly speaking, they are water regulation, instead of drainage schemes. In the years of heavy rainfall the surplus water is drained out by the canals and sluices, and in years of drought fresh water from the river is let in for cultivation and drinking purposes. These drainage projects can only be successfully constructed, where the out-fall is at a point, on a tidal river, where the water is not brackish.

2. Rajapur drainage works.—This consists of fifteen and-a-half miles of main channels, five and-a-half miles of branch channels, thirteen miles of subsidiary channels and improved old *khal*, one outlet sluice of twenty vents, three small single-vented irrigation sluices, three road bridges, one and-a-half mile of river embankment and other minor works. The total area that is drained by this scheme is 227 square miles, and the area which has been assessed as benefited by the scheme is nearly 65 square miles.

3. Barajala drainage works.—This is a part of the Rajapur drainage scheme, and consists of nine miles of drainage channels, one outlet sluice of four vents, five foot-bridges, and other minor works.

4. The total area which is drained by this scheme is thirty-and-a-half square miles, and the area benefited has been included in the assessed lands of the Rajapur drainage scheme, being 65 square miles for both Rajapur and Barajala as stated above.

5. Howrah drainage works.—This consists of 19½ miles of drainage channels, one outlet sluice of seven vents, five road bridges, eight foot bridges, two-and-a-half miles of river embankment, one small single-vented irrigation sluice, and other minor works.

6. The total area which is drained by the scheme is 49½ square miles, and the area assessed as benefited is 20½ square miles.

7. The cost and the estimated annual benefit of the Howrah and the Rajapur schemes, and the incidence of taxation in each, are compared below with those of the Dankuni scheme which was the first of its kind:—

Dankuni drainage scheme.

	Rs.
Actual expenditure on original works	4,11,500
Interest accrued before apportionment, i.e., between the 15th June 1873 to 30th June 1877	67,385
Add repairs up to 1886-87	27,754
Total	5,06,612
Add repairs from 1887-88 to 1890-1891, plus capitalized maintenance charges for the future	65,344
GRAND TOTAL	5,71,956

	Acres.	Rs. A.	Rs. A. P.	Rs.
Area reclaimed	2,232 at 7	8 × 13'3 or 99	12 0	=2,22,642
1st class benefited	5,342 at 3	0 × 13'3 or 39	14 4'8	=2,13,145
2nd class "	4,551 at 2	4 × 13'3 or 29	14 9'6	=1,36,183
Total				5,71,975

The difference of Rs. 11 is due to the fraction 13'3 not being carried out far enough. Besides the sum of Rs. 5,71,986 there has been collected interest due after apportionment Rs. 1,30,265.

I have not distributed this into a rate per acre, as it is impossible to say on what land it fell; moreover, it fell lighter or heavier according as the parties paid early or late.

	Acres.	Rs. A.	Rs.
Annual benefit	{ 2,232 reclaimed at	7	8=16,740
	{ 5,342 1st class at	3	0=16,026
	{ 4,551 2nd class at	2	4=10,239
Total			43,005

Capital of cost Rs. 5,71,986, divided by Rs. 43,005, annual increased rental, gives about 13·8 years' purchase of the improvement.

Howrah.

	Rs.
Actual expenditure on original works	3,45,743
Interest on the same to 1891	65,980
Total	4,11,723
Add maintenance charge from 1st January to March 1893	13,892
Add further interest on the capital sum from January 1892 to March 1893	21,609
Add capitalized maintenance charges for future	50,000
Add cost of collection establishment	27,700
GRAND TOTAL	5,24,924

	Bighas.	Rs. A.	Rs.
Area reclaimed	11,521 at 3	0=31,563	
1st class	21,531 at 1	0=21,531	
2nd class	7,233 at 0	8=3,626	
Special class	64 at 0	4=16	
Total	40,369		59,736

The capital cost of Rs. 5,24,924, divided by the annual value, Rs. 59,736, gives 8·7, approximately, as the number of years' purchase.

The incidence, therefore, will be—

	Rs. A. P.
On reclaimed land	20 1 7·2 per bigha.
" 1st class benefited land	8 11 2·4 "
" 2nd class benefited land	4 5 7·2 "
" Special class benefited land	2 2 9·7 "

Rajapur.

	Acres.	Rs. A.	Rs. A. P.
Area reclaimed	5,050·49 at 12	8=63,512	6 0
1st class benefited land	14,728·17 at 9	6=1,38,076	9 6
2nd " " "	13,470·01 at 3	2=42,093	12 6
3rd " " "	7,910·38 at 1	9=12,406	13 6
Total	41,210·55		2,56,089 9 6

	Rs.
The original cost with simple interest up to March 1895	12,44,438
Capitalized debt	1,42,857
Cost of collection establishment for 13 years	70,000
Total	14,57,295

The total cost of Rs. 14,57,295, divided by the annual increased value, Rs. 2,56,089, gives 5·69 as the number of years' purchase, but deducting Rs. 6,121 (the amount met from the profit fund), Rs. 14,51,174 is left which, divided by the annual increased value Rs. 2,56,089, gives 5½ as the number of years' purchase.

The incidence, therefore, will be—

	Per acre.
	Rs. A. P.
On reclaimed land	70 13 4
1st class benefited land	53 2 0
2nd " " "	17 11 4
3rd " " "	8 13 8

8. In the prosecution of these drainage schemes, the total expenditure *plus* interest for three years from the date of completion to that of apportionment as provided in the law should be such that the same may be paid off in ten years, simply from the increased rent.

9. By the recent amendment of the drainage law these schemes are likely to be popular, as much improvement in the law has been made and the hardships of the land-holders have been removed—first, by the abolition of the compound interest, secondly, by the reduction of rate of interest from 5 to 4 per cent., thirdly, by authorizing the land-holders to realize the drainage dues under the certificate procedure from the *rayat*, as well as from the co-sharers. Provision has also been made in the law for suspension of payments of the drainage *kists* in years when crops are destroyed by flood.

10. These drainage works are executed by the Irrigation Department of the Local Government. They are, after completion, retained under Government control. The money necessary for the prosecution of these schemes is advanced on the first instance by Government.

11. The land benefited by these works is assessed according to the degrees of benefit, and the amount is realized from the land-holders by instalments extending up to ten years.

12. The costs of repairs and maintenance charges are generally capitalized, and collected by the Government along with the capital outlay under the certificate procedure.

13. In years of drought the benefited area may be successfully irrigated by letting in river water and gradually raising the water-level in the drainage basin according to the requirements of the crops. The paddy in the low lands is sown first, and as the plants grow higher the water-level in the basin is raised to irrigate the higher lands where paddy is transplanted later.

The swamp-level is raised according to certain regulations adopted by experience to suit the welfare of the crops at different levels till the maximum level, *viz.*, 11.5 above mean sea datum, which may be called the *Irrigation level*, is reached at the time when the crops are about to ripen. The whole basin is drained before the crops are harvested. By this method, in years of scanty rainfall, the irrigation in the drainage basin is generally successful. The main crop grown in these basins is *aman* paddy.

14. These works have been constructed with a view to make them thoroughly efficient in all ordinary heavy falls of rain, and materially to improve the state of affairs in

unprecedented rainfall such as rarely occurs in these parts of the country. They are not intended to meet fully the emergencies of years of extremely heavy rainfall.

15. *Requirements of the District of 24-Parganas.*—A similar drainage scheme, called Chhrial Drainage Project, has been carried out in the District of 24-Parganas under the Embankment Act. The area of this basin is 37 square miles. Several such projects have been proposed by Mr. Maconochy for the improvement of the drainage system of the District of 24-Parganas in his Report No. 405, dated the 14th February 1901. Mr. Maconochy's report is full and interesting, and his proposed schemes are worth the consideration of the zamindars and other parties interested.

16. The District of 24-Parganas does not, in my opinion, require any purely irrigation scheme. Drainage projects as proposed by Mr. Maconochy which may serve the purpose of both drainage and irrigation are the works suited to the country.

17. The best thing that could be done to provide against drought and famine in the District of 24-Parganas and Hooghly—is to spend considerable sums of money every year in excavation of silted-up tanks, *khals* and *nalas* and also for the construction of new tanks. In most cases the District Board ought to take up such works, but when the projects are large they should be undertaken under the Embankment and Drainage Acts.

18. Hitherto, the land-holders were averse to undertaking such works under the said Acts owing to establishment costs, *viz.*, Rs. 26 per cent., being charged upon them by the Government. The Government have now been convinced of the inequity of this heavy charge, and it is now proposed to debit to the project the actual cost only of establishment charges instead of the percentage charges. This will go in a great way in reducing the cost of the drainage projects, and the land-holders will find it profitable to execute such works. The Bengal Embankment Act requires also amendments to facilitate the working of these projects. But I need not discuss the subject here.

19. *Eden and Damodar Canal Project.*—It is universally admitted that the Eden Canal Project has done much good to the people of the Burdwan and Hooghly Districts by providing them with good drinking water. But the supply of this water, which is also utilized for irrigation, is at present insufficient. The proposed extension of the Eden Canal system by constructing a weir in the Damodar has been much discussed. I have never been in charge of the works and have no personal knowledge of the subject. But as it is likely that the silted-up rivers, as the Karna Damodar and the Saraswati, would be supplied with fresh water by such a scheme, on sanitary grounds the extension would be beneficial to many people of the Hooghly and Howrah Districts. The irrigation from the Eden Canal is undoubtedly more popular than that from any other irrigation works I know of. Whether the proposed scheme—which will cost eleven lacs of rupees—will be paying, is doubtful. But it is certain that the irrigation will be greatly extended and appreciated by the cultivators who will be materially benefited.

1. Q. (President).—Where are these drains; are they above Calcutta?—In the Hughli and Howrah Districts.

2. Q. All above Calcutta, I suppose?—One is above Calcutta and two are below Calcutta. One is just on the southern side of the Botanical Gardens.

3. Q. Can you take water from the river, or is it brackish?—In February and March the water becomes brackish; but in April and May—the cultivation season—the water is sweet enough.

4. Q. In Howrah and in the 24-Parganas no irrigation is necessary?—No.

5. Q. You never had anything like famine in these parts?—No.

6. Q. Have you had any experience of the country watered by the Eden Canal?—I was at Hughli and I have learned something about it from the people there, but I have no personal knowledge.

7. Q. Have you heard any complaints that the irrigation there causes swamps?—Irrigation, on the contrary, was very popular there. It fertilises the soil.

8. Q. It has been said that it raises the subsoil water to such an extent that it creates wheels and swamps?—I have not heard that.

9. Q. Do you think that the District Board is a suitable body for carrying on works of this sort?—No; large schemes like these cannot be carried on by District Boards. Experienced Engineers of the Irrigation Department are necessary for the execution of these works.

10. Q. Can they keep them in order?—They alone cannot do that. The Irrigation Department ought to be in charge of that.

11. Q. You do not think that they should be trusted to do the silt clearance?—No, I think it is better that the Irrigation Department should be entrusted with this.

12. Q. (Sir T. Higham).—You are entrusted with the drainage works of the Howrah and Hughli Districts?—I am at present Land Acquisition Collector of 24-Parganas. I was in charge of the Drainage Works of the Howrah and Hughli Districts.

13. Q. Whom do you serve under?—Under the Collector.

14. Q. What have you to do?—I make surveys in connection with the land benefited, assess it and then apportion off costs and take charge of the collection and collect the same.

15. Q. With regard to your drainage schemes you assess differently separate areas of land?—Yes, because originally it was a swamp; some lands were lying waste; some

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used to get crops when the rainfall was scanty, and so on; the lower the land, when the drainage scheme was started, the greater was the benefit derived.

10. Q. Then you don't charge a uniform cess on the land?—No.

17. Q. You take capital expenditure?—Yes, and I make my estimate on the increased value of the land.

18. Q. What is the amount you recover?—Capital cost plus interest and working expenses; maintenance and other charges are capitalised, and that, along with the original cost, is apportioned once for all. There was a provision for compound interest, but we never charged it: we recover the capital amount in ten yearly instalments.

19. Q. Then at the end of ten years what happens?—The whole thing is realised, and then the landlords get the whole benefit.

20. Q. Then who does the maintenance?—The maintenance is done by Government, because the Government has realised the cost and maintenance.

21. Q. Do you mean to say that the landowners have to pay the whole of the cost, and all, within ten years?—Yes; sometimes they pay within a shorter time; they do not like to take advantage of the whole period, and pay sometimes within two years.

22. Q. Are there any more of these kind of works?—There are certain drainage schemes proposed by Mr. Maconchy in the 24-Parganas and they are under consideration by the District Boards concerned and zamindars.

23. Q. Does the District Board administer?—The District Board try to induce the zamindars. There are three Acts under which these schemes may be taken up—(1) the Bengal Drainage Act (VI of 1880), (2) the Bengal Embankment Act (VI of 1883), (3) the Sanitary Drainage Act (VIII of 1895). The District Board has control over those taken up under the Sanitary Drainage Act, and they may contribute a share of the cost. But these drainage schemes have been taken up under Bengal Drainage Act (Act VI of 1880).

24. Q. Have they contributed in any of these?—No; all these schemes were carried out with the consent of the landholders and tenants. They give their votes. Under the law they had to give their votes. Unless more than half the landholders give their assent, the scheme is not carried out.

25. Q. What do you have to do when you want the land?—The land has to be acquired under the Land Acquisition Act.

26. Q. Will it be possible to carry out small irrigation schemes in the same way, and recovering from landowners capital cost?—Yes, on small projects.

27. Q. Can you distribute the capital cost according to the benefits received in the same way?—It is practically

done in a summary way for schemes taken up under the Bengal Embankment Act VI of 1882. In small schemes the summary way of distributing costs prescribed under the Act is not complained of. But in big schemes the distribution becomes necessarily inequitable, unless a cadastral survey of the benefited land is made.

28. Q. Supposing Government were to acquire land for tanks in the district, and the money for this was charged to capital cost against the landlord, could you distribute it, and recover it in the same way?—I could distribute it, but whether it would be popular or unpopular I cannot say.

29. Q. You said the drainage was popular?—It is, but it was to a certain extent unpopular; most of the hardships have, however, been removed by recent legislation.

30. Q. They now charge less for interest?—They charge less for interest and they charge less for capital cost, as Government have now found that it is not fair to charge 20 per cent. on the capital cost for the works executed by these Engineers. The Collector could realise the cost from the landlords under the certificate procedure, but landlords were left to sue their tenants in Civil Courts, and they could not realise. The result was that some of the petty landlords were ruined. Hence Government has now authorised them to enforce certificate law against the tenants.

31. Q. Why could not that be done in the case of irrigation?—All I know is that it is not done in these districts. I may say in connection with the drainage works referred to by me that during scarcity of rain we actually irrigate land by letting in river water. These schemes serve both irrigation and drainage. Pure irrigation schemes are not necessary in these districts.

32. Q. I am not speaking of the 24-Parganas. Just as you recover drainage expenditure in the 24-Parganas could you not recover irrigation expenditure in the same way in other districts?—If the scheme is popular and they really want water, then it would be popular and pay; otherwise not.

33. Q. Would it be very popular to charge water-rates?—There are schemes in which the Government have borne the whole of the cost. Water-rates are not popular apparently?—Water-rates are popular in certain places, such as in the Eden Canal project.

34. Q. You say in paragraph 17 that the best thing that can be done to provide against drought and famine in the 24-Parganas and Hughli is to spend considerable sums of money every year in the excavation of silted up tanks, khals and nullahs, and also for the construction of new tanks. Are tanks much used for irrigation?—In the Hughli District I know they are used, but most of them are silted up.

35. Q. If they are useful for irrigation, how did they get silted up?—They did not keep them in repairs.

36. Q. Why?—Because they could not pay for excavation. It was originally excavated by the zamindars.

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WITNESS No. 65.—RAI BAHADUR KRISHNA CHANDRA BANERJI, Inspector of Works, Burdwan.

Reference to points of the Memo. to be considered by the Irrigation Commission in Bengal.

A Note on the Memo. of points to be considered by the Irrigation Commission in Bengal.

I must confine my remarks to the Burdwan Division only of which I am Inspector of Local Works.

(a) Bankura and Birbhum are generally undulating, whereas the greater portion of Burdwan and Midnapur and the whole of Hooghly and Howrah Districts are low and flat. The soil of the high lands in the first four districts is more or less gravelly, but that of the low lands in the above districts, as well as the soil of Hooghly and Howrah, is loamy. The soil is suitable for irrigation.

(b) I am of opinion that irrigation would increase the produce of the land and secure it from the effects of a failure of the rainfall.

The Damodar canal project, if carried out, would greatly benefit the country (1) by preventing the ever-recurring flood damages, the money-value of which is considerable, (2) by irrigating the land between Raniganj and Hooghly.

It is also necessary to re-excavate all the old tanks in the several districts, excavate new tanks and construct impounded reservoirs at suitable places. Government and District Boards should contribute towards the construction of these works. Zamindars might also be induced, by granting them loans, to undertake these works for the benefit of their land. I have had charge of two famine operations, viz., those at Darbhanga in 1897, and at Ranchi in 1900. It is a mistake to suppose that failure of crops is caused by

1. (a) General configuration of the country; character of the soils, and their suitability for irrigation.

(b) Utility of irrigation in increasing the produce of the land and in securing it from the effects of a failure of the rainfall. General measures which should be adopted for extending irrigation in each district either by Government or private works.

5. Private irrigation works other than wells, etc.

deficient rainfall alone. In the majority of cases it is, in my opinion, due to irregular rainfall. During 1900, as far as I recollect, there was copious rainfall till August, but the rains ceased entirely after that month. The result was that the paddy dried up on the high lands; and instead of an average crop, as was at first expected the crops turned out to be very poor and some of the Districts, such as Ranchi and Palamau, were threatened with a famine of more or less severe character. Had there been a sufficient number of tanks or reservoirs in existence at suitable places so as to command areas according to their capacity, it stands to reason that they should have saved a considerable proportion of the crops which perished for want of this fertilizing moisture. As a matter of fact, all portions of valleys in the Ranchi District which had reservoirs at their heads yielded a fairly good crop during that year. In the districts composing the Burdwan Division well irrigation is conspicuous by its absence. The people are too lazy to draw water from wells for purposes of irrigation. The average depth of water in Bankura, Birbham and the high lands of Midnapur is 40 feet, whereas in the low lands of Burdwan, Hooghly, Howrah, and southern portion of Midnapur the average depth may be put down at 25 feet.

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6. Wells.

Cost of wells used for irrigation.

Average area irrigated per well. Is it possible or desirable to stimulate the construction of new wells?

7. Black cotton soil.

10. Programme of Relief Works.

In tracts where drainage or flood embankment is more required than irrigation, information, as to any projects, etc.

As far as I know, no wells are used for irrigation in the Burdwan Division. The cost of ordinary *pucca* wells would be Rs. 500, whereas that of wells with certain rings would be about Rs. 30.

About five acres per *pucca* well. It is desirable to stimulate the construction of new wells for supplying drinking water but not for irrigation purposes, as the people will not use them.

As far as I have seen, it is not to be found in the Burdwan Division. Ghooting soil is to be met with in the Burdwan District, which is akin to the black cotton soil. The usual depth is 8 to 10 feet.

Programmes of Relief Works have been prepared in all the six districts of the Burdwan Division. They consist mostly of "village works" such as small tanks and roads. They are distributed pretty fairly over the areas liable to famine. Their utility is indisputable.

There are two projects which are, in my opinion, very important, viz., (1) a large portion of the Hooghly District between Hugly and Turkeswar is at present water-logged, owing to the silting up of the mouths of the Saraswati and Kunti rivers, which used to drain this low area. The crops are damaged almost every year. It would be better if a short drainage cut be made connecting this low area and the Ganges somewhere near Balli.

(2) The second low area is situated in the Howrah District, and is called the Kondua Jals, which is almost annually submerged for months together for want of proper drainage.

In addition to these I must say that something should be done to protect the vast area between Arambagh and Ghatal which are yearly devastated by the floods of the Damodar, Silai and Cosye rivers. This vast quantity of water, which now runs to waste spending its destructive effects over the valuable lands it inundates every year, might, in the matter proposed by Mr. Maconochy, be sufficiently brought under control and thus made to convert those devastated areas into "lands of plenty." I am disposed to think that the owners of the lands thus benefited might contribute a substantial sum towards the construction of these works, which will, no doubt, be eminently protective.

1. Q. (*The President*.)—Have you had any famine relief experience?—Yes, in 1896-97 and in 1900-01 I was in charge of famine operations: once in Durbhanga, and in 1900-01 I was in Ranchi.

2. Q. You have never seen famine in your present circle?—No.

3. Q. Is such a thing known there?—I went there in 1898: since then there has been none: there has been a deficiency in rainfall, but no famine.

4. Q. You say it is also necessary to re-excavate old tanks and construct new tanks. I don't know if you have heard the evidence this morning. Sir Thomas Higham elicited what an immense cost it was to excavate a tank and what the cost is for every acre. You heard that I suppose?—No, I was not here at the time.

5. Q. It is always found in the south of India, where there are many hundreds and thousands of tanks, that it does not pay to excavate silt out of the tanks. You are so differently situated here, because there are no dams across the mouth of villages and along hills. You have underground tanks in Bengal?—We have some *dunds* in the undulating parts of the country near Bankoora.

6. Q. Do they use *aharas* there?—Yes.

7. Q. (*Mr. Muir-Mackenzie*.)—In Bankura there is a great deal of well irrigation?—Yes, it is like Purulia and Chota Nagpur in that respect.

8. Q. (*The President*.)—Have you experienced distress where well irrigation is largely used?—No.

Rai Baha- 9. Q. You say here it is not used?—In this district they
dar Krishna don't appreciate well irrigation at all. The people are too
Chandra lazy; they are not used to them.
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10. Q. In many cases the spring level is not far below the surface and yet they would not take to it?—We have built wells for drinking purposes, and in some cases we have seen they are not used. They won't take the trouble; they are not used to drawing water from wells.

11. Q. Do you think that they are an indolent people here?—In a manner, yes, they do not like that sort of thing. Generally the rainfall is pretty good in the districts and the tanks do not fail.

12. Q. Have you anything to do with relief works in your present division?—I have had in Ranchi but not here.

13. Q. You said the programme of relief works have been prepared in the districts of the Burdwan Division?—It is quite right.

14. Q. Under the orders of the Government of India they should be prepared, but it will be a long time before relief works will be wanted?—Yes.

15. Q. You say there are two projects which are in your opinion very important: one is the drainage of the Hooghly District and the other with reference to Turkesur. That does not come within our consideration as irrigation people. From what you have described here it appears to be a very large tract. How much is it?—About 200 square miles.

16. Q. (Sir Thomas Higham.)—Is it worth while clearing out tanks for the sake of storing water?—You recommend that whole tanks should be excavated; how much water would you require for an acre of rice?—6 inches.

17. Q. That is about 20,000 cubic feet?—It varies. It depends upon the degree of deficiency of the rainfall.

18. Q. In dry years do you think 6 inches would be enough?—Yes.

19. Q. What will be the cost of excavating that?—About Rs. 2-8 a thousand.

20. Q. That will require Rs. 50 for every acre for which you wish to provide storage?—Yes.

21. Q. If you pay interest on that at 12 per cent., it will be Rs. 2 an acre. Can they afford to pay Rs. 2 an acre? Can you expect people to clear out these tanks for the sake of the benefits? To clear out a tank costs a lot of money?—This is done once in fifty years. If you spread it out over fifty years it will be very small.

22. Q. One witness told us that this would have to be done once in twenty years. There is no data from which we can find out what the amount of silt would be. We do not know, in the first place, what the original capacity of the tank was. Supposing we allow people money to clear out tanks, do you think that they would get so much benefit that they could afford to pay 4 per cent. on the money?—They give money-lenders very much more.

23. Q. Look at it as a matter of business. It costs them Rs. 50 for every 20,000 cubic feet of water. Would they get so much out of every acre of land that they could afford to pay for it?—If it is spread over 20 years, they could afford to pay it.

24. Q. The interest would be the same if it was for ever. In many years they would have plenty of water without it?—Yes, of course, the tank water would be used in dry years, or when the rainfall was irregular.*

25. Q. I want to know whether people could afford to clear out tanks for the benefit that they would get out of them without Government help?—I do not think so. I do not think that they could afford to do it without Government help.

26. Q. I hear on all sides that Government should clear them out. The only question is whether it would pay to clear it out unless they are helped by Government?—I do not think so.

27. Q. You think they must be helped?—Well, in the shape of loans, yes. It may be recovered from the people.

28. Q. They must pay more than the interest. They will have to pay back the original loan. Have you got your famine relief programme with you?—I have not got it here.

29. Q. Is it in print?—The whole programme is not completed yet. Many have been submitted.

30. Q. Has it been submitted to the Local Government?—Not all of them.

31. Q. Is it revised every year?—Yes.

32. Q. What is the last accepted programme?—I think it is last year's.

33. Q. Is that in print?—I think it is.

34. Q. How many men do you employ in relief work in your district?—All the districts are not subject to famine. Only portions of the district which are or have been made out. I have not got these figures with me now. Ten per cent. of the population has been assumed as likely to require relief during famine. They are generally proposed to be small tanks. In Bankura where ground is undulating reservoirs can be made; but where the country is flat we have proposed excavation of tanks besides construction of roads.

35. Q. They are only good for drinking water?—They are also good for irrigating purposes.

36. Q. Have you put that in your programme?—In some cases we have done that.

37. Q. Our opinion is that there are large tanks all silted up, and that it will never pay the Government or the zamindar to re-excavate. When you have famine you have to employ thousands of labourers. Could not you employ them all to clear out tanks?—That must be the principle.

38. Q. Is that down in your programme?—Yes.

39. Q. I understood you to say that your programme provided only for excavating deep tanks?—I corrected that. There are some re-excavations also provided for in the programme.

40. Q. One would think that it should be the principal item in the programme?—We take new tanks as well.

41. Q. New tanks are no good; are they?—In some cases where there are no tanks it was proposed by the Collector and Chairman of the District Board, for instance, in Birbhum that tanks were necessary for purposes of irrigation.

42. Q. You constructed a lot of tanks like that at the previous famine relief?—Yes, they did some good.

43. Q. What good?—In irrigating.

44. Q. They do not irrigate?—I believe that in Durbhanga they proved useful.

45. Q. You have to lift the water?—Yes. They use tank water for irrigation purposes.

46. Q. Would you put in your programme a tank which belongs to a private owner and which has silted up? Would you put your relief labour to that? Is that in your programme?—Re-excavation of private tanks has been provided for in some districts.

47. Q. You have a number of them in your programme?—Yes, I could supply you with a list of them.

48. Q. In your note you were speaking of a vast area that is flooded every year. What is the extent of the damage?—Can you give me any idea of it?—I think a lot of sand is thrown over the land. It is not cultivated at all, and villages are swept away.

49. Q. The cost of preparing a reservoir, as you are aware, would amount to two crores of rupees. Is the damage anything like what would justify such an expenditure?—The damage is incalculable. This covers about 200 square miles of country.

50. Q. Does the area that is put out of cultivation expand every year, or does the silt go over the same land?—I mean every year there is a flood. The Damuda floods come down and devastate the whole of this country.

* What I mean to say is this. The ordinary cultivator in normal years would get about 12 to 16 maunds of rice per acre, or say 14 maunds in the average, which at Rs. 2 per maund would bring him, say, Rs. 28. Deducting his expenses, say Rs. 15, his profit would be Rs. 13 nearly. Out of this, he could conveniently put by Rs. 8-6 per year, to cover the interest, which would be Rs. 1 on the average, and Rs. 2-8 to pay up the loan of Rs. 50 in 20 years. This would still leave him about 9-8 as net profit per acre. I am speaking of the Burdwan Division only. In dry years this amount would of course be readily paid, as the water would be essentially necessary for the very life of the crops. The tank water is besides used for drinking purposes. At present in the dry weather, if table water becomes scarce in some of the districts, and there is almost a water famine at times. The cultivator, moreover, reaps another benefit from his tank, viz., fish, and the revenue from this source is not inconsiderable. In these circumstances, I am inclined to think, there will be no difficulty in realizing the above amount from the cultivator, if advanced by Government.

WITNESS No. 66.—RAI BAHADUR BAMA CHURN PARAMANIK, Executive Engineer, Northern Drainage.

1. Q. (*The President*).—You are the Executive Engineer, Northern Division?—I have retired from Government, but I have been re-appointed since the last two years. At present I am Officialing Executive Engineer, Northern Drainage.

2. Q. What is your rank in the Department?—Now I am officiating.

3. Q. Are you Executive Engineer just now?—Yes, on the Northern Drainage and Embankment.

4. Q. Mr. Gordon tells me that you know a great deal about the Eden Canal?—In 1879 I constructed the canal from the beginning. I was in charge for 18 years continuously.

5. Q. The canal was not meant for irrigation?—It was not originally meant for irrigation; it was meant for the supply of drinking water; it was for sanitary purposes.

6. Q. Are those sanitary purposes still considered?—Yes; whenever we can spare water for sanitation we do so; generally the whole of the water is taken up for irrigation; the original purpose is lost sight of.

7. Q. Are you merely giving the sanitary people what you don't want yourselves?—The people wanted more for irrigation than for sanitary purposes.

8. Q. What does the Sanitary Engineer say?—He wants it, but he does not press for it.

9. Q. Do people not get enough water four years out of five?—No; the canal is limited in scope. It can carry only 800 cubic feet, but we could force down 1,000 cubic feet without any danger to the works.

10. Q. But what I am surprised at is that the people should attach so much importance to irrigation when they get a large rainfall; if you had more water in the canal would they take it?—Yes.

11. Q. If the canal was enlarged to 1,200 cubic feet, would they take it?—They already take at least about 800 cubic feet.

12. Q. Would they take 1,200?—Yes; in fact they will take 2,000.

13. Q. What is the difficulty—the absence of a weir at the head?—Yes.

14. Q. Have you gone into the question of a weir? The best site, design, and so on?—Yes; the site of the weir should be at Raniganj, because much depends upon the site. If we make it at Jolooty, the cost may be less, but the cost of the upkeep will be very heavy for the reason that there is an immense amount of sand brought down every year and all that sand will go into the canal and block the channel in no time.

15. Q. Mr. Horn has estimated the cost at 8 lakhs?—Yes.

16. Q. Do you think that people would pay more for water than they do now?—They would pay 8 annas per bigha, or Re. 1-8 per acre without difficulty. In Midnapur we charge about Rs. 2 per acre.

17. Q. If you could give them all the water they want here, could you charge them Rs. 2?—No, I do not think so. I have been charging them at the rate of Re. 1 per acre. The people here have been used to this cheap rate, so they will naturally demur at being charged at higher rates.

18. Q. Would they refuse the water?—At first they probably would, but I think in time they would agree to pay. They will of course hold out as long as they possibly can.

19. Q. Can you not send the water on to other lands if they refuse?—We cannot divert the water to other places that are not commanded by the canal.

20. Q. You only irrigate about 30 acres to the square mile?—At present we do 30 acres to the square mile, but we shall certainly be able to do more.

21. Q. Have you anything to do with famine relief works?—I was never in charge of famine relief.

22. Q. Do the people in the Eden Canal make their own water-course?—We have been making them since last year. Government are giving Rs. 3,000 for village channels alone; but this is done under the contribution system, and we will realize the money afterwards by instalments.

23. Q. Then there is the next question of the project for the Damodar weir?—When Captain Garnaut first made his project, that was in 1868. The Damodar Canal was sur-

vayed and the project was prepared by Mr. Whitfield. When he went away Mr. Unwin was in charge. The weir was about to be made when Lord Mayo was murdered and the whole thing was shelved. He was to have laid the foundation-stone of the weir.

24. Q. You say you have been 18 years in charge of the Eden Canal?—Yes, ever since the commencement of the canal. I made the canal.

25. Q. Did you hear the evidence before lunch?—No.

26. Q. I was asking one witness why it was that in 1892 you irrigated about 70,000 acres and now you irrigate only 30,000 acres?—In 1890-91 it was only 6,000 acres. In 1891-92 the canal was first opened. We used to give the water free of charge till 1890. Four thousand eight hundred and eighty-seven acres was the irrigated area in that year. This was when the water was given to the people free. The following year less was taken. In the last year when there was fear of a drought and famine the Collector of Hooghly wanted water taken and he was responsible for the water-rates.

27. Q. In former years you gave water free?—Yes, the Government saw that a large amount of money was wanted for clearing the silt, and so they wanted to charge the people a low water-rate.

28. Q. That 60,000 acres was only given at the end of the season?—Yes, in October.

29. Q. In 1901-02 you watered about 25,000 acres?—Yes.

30. Q. When were the long leases given?—The 5 years' leases began in 1901-02. Most of these were given outside the commanded area. The leases were within the commanded area. There were special circumstances and we were obliged to give them.

31. Q. Then in 1901-02 you had leases for something like 17,000 acres?—Yes.

32. Q. Then next year you gave 70,000?—Yes, we had 12,000 on leases and the rest were not on leases.

33. Q. Where did you get the water?—There was plenty of water. This was not at the end of the season. This was in the middle of the season—about September. In all we have got leases for 30,000.

34. Q. Did they all apply for water in 1901-02?—Yes, and they afterwards refused to pay for the extra area, and we were obliged to give up our claim; we had plenty of water. We could not give them all this water in October, and if they had wanted it, we could not have given it; but this was in September, and we had plenty of water higher up and we sent it down. Most of this was in the Kana Damodar. The long leases increased a great deal, up to 29,000, the figure we have now reached.

35. Q. Your revenue does not pay your working expenses?—Our revenue pays. We spend very little on collections.

36. Q. But as to your repairs and maintenance?—We spend about Rs. 30,000 on maintenance.

37. Q. You spend more than you receive?—Yes.

38. Q. How do you charge establishment?—We have not a separate establishment.

39. Q. You charge percentage?—No, we charge the actual figures.

40. Q. But your pay as Executive Engineer?—Our pay is not charged.

41. Q. Nor the Sub-divisional Officer's?—No; we have half a dozen mohurrirs, half a dozen sircars and zilladars and half a dozen peons.

42. Q. The cost of which is put down as Rs. 13,000 a year?—I am surprised at that; it must be wrong. We don't spend Rs. 2,000 a year.

43. Q. But this is compiled by the Government?—Our salaries may be included.

44. Q. (*Mr. Muir-Mackenzie*).—I have not quite understood this about the 71,833 acres; was any part of this on lease?—About 15,000 acres were on lease.

45. Q. The rest only received one watering; was that watering wanted?—Certainly, it was very much wanted at the time, otherwise the crops would have failed.

46. Q. Was there any subsequent year that a single watering was required?—Yes; as, for instance, now. We cannot give them even a single watering. Then we had just cleared the silt from the channels of the Banka and labour

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was very cheap then, and we could get a large quantity of water in the reservoir.

47. Q. You cannot do that now?—No, because the Banka is all silted up and the channels are all high and dry, and we cannot get water without a weir.

48. Q. Have you had many applications made to you for leases?—Yes, and we have had to refuse them.

49. Q. How many applications have you refused?—I think this October there have been not less than 50. I think more than 100 applications have been refused.

50. Q. Covering how large an area?—Sometimes a village consists of 500 or 1,000 *bighas*. On the average I think we have refused applications for nearly 8 or 10 thousand acres.

51. Q. And if there was an assured supply of water, you would have even more applications?—Yes, they know that our resources are limited, and so their applications are unlimited.

52. Q. (Mr. Rajaratna Mudaliar.)—Is the present supply sufficient to irrigate 86,000 acres?—No, the supply that enters the canal is insufficient, because the canal has silted up at the head.

53. Q. Are you in a position to give a full supply for over 86,000 acres?—Only during the rains, not in October.

54. Q. Are there many complaints?—Many, and there is great difficulty in collecting the water-rate afterwards. We have generally to take recourse to the law and use the Public Demands Recovery Act.

55. Q. Do you not think it would be fair to grant remissions in such cases?—We do grant remissions.

56. Q. What is the average?—I think we grant remissions up to not more than about Rs. 1,000; generally between Rs. 500 and Rs. 1,000, when we are convinced there is a large area included that we have not been able to supply.

57. Q. How often does this difficulty occur?—Almost every year. Sometimes a timely rainfall saves the crop. At other times when we think we are going to have a shower it does not come down, or at any rate we receive very little. Some time ago we had only '38" rainfall, but if it had been '38" it would have saved all the crops.

58. Q. What are the crops likely to be? How many annas?—In the irrigated area about 12 annas to 14 annas; in the non-irrigated area it would vary from 8 annas upwards.

59. Q. You have very seldom less than an 8-anna crop?—Yes.

60. Q. What is the supply from the river in October?—It was just measured the other day. It was found to be 1,200 to 1,300 cubic feet. That would be quite sufficient to irrigate our leased lands if you could take all that water into the canal.

61. Q. In a dry year what is the amount of water available?—Less than 1,000.

62. Q. If so, do you think you will be able to extend irrigation?—We shall be able to extend irrigation really if we can bring water into the canal, but without a weir we cannot do anything. There is only 25 cubic feet per second just now entering the canal.

63. Q. Would it be possible to economise water with better distributaries?—Yes, if we have more partitions and have more distributaries, we could save 10 to 15 per cent. of the water.

64. Q. Will the cost of these village distributaries be very heavy?—No, we are doing it gradually. We are doing one or two every year.

65. Q. Why do you not do the whole of it at once if it will not cost very much?—What is the good, unless we

are sure of the supply. There are several applications for water, and people are willing to make channels out of their own pocket. Only yesterday I have received an application from certain people who are willing to pay Rs. 20,000 for a weir across a certain nullah, but we cannot supply that nullah with water.

66. Q. You grant long leases to persons who own no land and give them 12 per cent. commission?—Yes, to headmen of the village. We always select two or three headmen from whom the water-rate is received. They are men of substance and we can realise our money from them and they get two annas in the rupee as commission.

67. Q. They have no power to collect?—It is very difficult for them. These people who are in lease with us cannot do so. They have to go through the Civil Court which is a very cumbrous process. A great deal of time is wasted. There are applications and counter-applications. They contest the claims. Therefore this system is not very popular.

68. Q. Would you deal directly with the tenants?—That would involve a great increase in expenditure, especially in establishment.

69. Q. Would not that be covered by the 12 per cent. you now have to pay?—If you extend the canal and make a weir, it would be almost impossible to deal with the individual *rayats* unless you are prepared to pay a great deal more for the establishment than you had at present.

70. Q. Under present conditions will not 12½ per cent. enable you to meet the increased establishment?—In each village there is never more than 300 to 400 acres. That means three to four hundred rupees as water-rate. One-eighth of that is very little.

71. Q. At present what is the guarantee that a landlord pays all the amount that is due for the year for the area actually irrigated?—We have no security deposited from them.

72. Q. That is not what I mean. Supposing a man takes a lease for 100 acres and he probably irrigates 200 acres, what is the guarantee that he does not defraud you?—Our *zilladars* are going about with their eyes open. If such surreptitious practices occur, we hold them responsible.

73. Q. You think they are sufficiently honest to be depended upon?—In my 23 years' experience I have never heard of a case in which the *zilladar* has done any such mischief.

74. Q. Does any superior officer check his measurements?—Yes; the Sub-divisional Officer checks it whenever there is an increase of area. He satisfies himself that the *zilladar's* report is correct.

75. Q. Suppose a *zilladar* does not report? If there is not a complaint how can you know?—There must be a complaint. A *zilladar* may be hiding the true fact, but the *peons* sometimes bring cases to our notice. This has happened in several cases and this acts as a great check on the *zilladars*.

76. Q. (Mr. Allen.)—What are these maintenance charges for? For clearing silt out?—Yes; the annual expenditure is Rs. 25,000.

77. Q. What is it for?—It is generally Rs. 5,000 more. We spend about Rs. 30,000.

78. Q. What for?—For clearing out silt. The masonry work requires very little repairs.

79. Q. You said that the Damuda brings down tremendous quantities of sand; what kind of sand?—Very heavy sand. The finer particles are used for plaster and the heavy sand is used for filter-beds.

80. Q. It is not good for manure?—No. Do you know about the removing of the embankment on the right bank of the Damuda?—I removed it. It is a very long story.

TENTH DAY.

Calcutta, 7th November 1902.

Mr. W. G. Macgregor. WITNESS No. 67.—Mr. W. G. MACGREGOR, Manager of Lakhimpur and Hardwar Estate in Bhagulpur and Sonthal Parganas.

7 Nov. 02. 1. Q. (The President.)—What districts are you best acquainted with?—Bhagulpur and Saran.

2. Q. Do you know them both pretty intimately?—Yes.

3. Q. Take Saran first. We had a great deal of evidence

when we were up at Muzaffarpur and Bihar as to the unsatisfactory state irrigation was in there. It was very strongly brought to our notice by several planters and also by the Collector and some other official gentlemen who were there, and the argument laid before us was that it would not be a difficult thing to restore irrigation and put it on a satisfactory basis, and that it would not be very expensive and difficult. If the Government would do that, it might be handed over to the District Board, and its maintenance borne by a small cess on the whole district, inasmuch as the whole district would benefit by it. This argument was justified by reference to the embankment cess which was levied on the same principle. It was suggested that a cess of quarter of an anna to the rupee would keep it in working order. Mr. Growse and several other witnesses pressed it upon us. Then we saw Mr. Slack who most emphatically condemned it, and said that a cess of this sort would be most monstrous, as a very small number of people would be benefited, and he recommended that nothing should be done. We shall be very glad to have your opinion on the subject?—There is no good going into details as to the difficulties. The *sotas* are silted up owing to the high level sluices and there being no water to clear them out. That being so, I think Government is almost in duty bound to do something to keep these channels open in years of scarcity. In other years it will not matter so much, but *rabi* crops along these three rivers, in years of short rainfall, would almost be made a certainty. As you go lower down they are great people for lifting water out of the earth. The only thing is that I would limit the cess to those who received benefit by it. You could not limit it to the area irrigated; it would make it not only too heavy, but very difficult and necessitate a very large establishment. There is an area on the other side of Saran which would not benefit by this at all and which should therefore be left out. I would only levy the cess on those who directly and indirectly benefited by it.

4. Q. Is that a fairly well defined area?—Yes. This is an old scheme. (The witness here explained the scheme by a map on which he pointed out the parts that should come within the scope of the cess and the parts which should be examined.)

5. Q. (Mr. Allen).—Would you exempt more than half?—More than half would come in.

6. Q. (The President).—Mr. Ogilvy, who manages the estate, was anxious to have two sluices?—That would be better. Then there would be no reason for exempting that part. The sluice would take in this part. I am only talking of the old sluice gates of the old canalisation scheme.

7. Q. Then as regards that part of the country that would not actually get water, do you think a cess would be fair?—I do, and when it is thoroughly established on a good basis people would take to making channels themselves; at present they never feel inclined to do so. It never was a satisfactory scheme. There was only one year that I saw this thing of any use, and that was only in one river. All the others derived no benefit. The people on this side of the river irrigated the *rabi* land and sowed it and got a very good crop; the people on the other side did not. On this occasion they irrigated in October and November for *rabi*. *Rabi* would never germinate. They erected sufficiently to make *rabi* germinate.

8. Q. I think it was more for *kharif* than for *rabi* that it was pointed out?—When you talk about irrigation one looks to rice as the principal crop, but *rabi* would benefit very largely.

9. Q. Do you think that the District Board would manage it properly?—Not with the present staff; it would have to be increased. With an increased staff I do not see why it should not. I certainly think that the Board would be quite sufficient with an increased establishment.

10. Q. Do you think that the people would take water every year or almost every year, or would they only take it in years of great drought?—I think the country there would take it every year when they got into the way of it. Of course there are exceptional years in which there are exceptional rainfalls and in these years they would not take it. A water-rate per acre would necessitate a very extensive establishment, and the scheme then, I imagine, would be perhaps justified. The present scheme would probably be clearing out the sluices, cuts and the channels and opening out the original nullahs. If you want to charge something on the acreage to make that pay, you must require a high level canal. You would require a much greater return and be able to put on such a high rate per acre as would necessitate a very considerable increase in that way. As at present, it is not a high level

canal; the benefits would not be much felt. I should feel inclined myself to suggest that a small increase be collected along with the Government revenue.

11. Q. We were advised by Mr. Horn, Chief Engineer, that really to work the thing satisfactorily there must be some sort of weir or for something across the silt outside the bar?—Yes, outside the embankment. This is simply silted up for want of use. In the old days before the embankment it was always open.

12. Q. That was a very long time ago?—Yes, but the rivers are as they were before; it was only on the top that they got silted up.

13. Q. (Sir Thomas Higham).—The difficulty is not so much the silting up, but that at the critical time when you want water there is not sufficient water in the high level, and there is too strong a current for them to bund up, and they have to wait until the river is run down and then it is too late?—Of course it will be impossible to bund the whole of the Gandak. The water comes from the Gandak into the *sota*.

14. Q. It is merely a channel of the Gandak?—Yes, it is just a channel. Of course it is impossible to say; I have not seen it for so many years.

15. Q. Mr. Horn is quite clear that there should be something in the nature of a hard bund which could not be washed away?—Yes, something in the nature of a masonry bund to be permanent.

16. Q. I suppose there is no question that irrigation is appreciated?—It is very decidedly appreciated in Saran. I don't think myself that Saran is an exceptional district. I do not think the high rates ruling for land there are owing to any excessive return from the land so much as from the fact that there are a number of those producers outside the district who send their money to the district. It is an extraordinary district. Many villages range there above any returns that it would be possible to make and the people pay willingly.

17. Q. Because they are making money?—Two out of every five are able-bodied men and are in service in Bengal, and they send all their money back by post office order, and they pay fancy prices for land in Saran far and away above what they are able to get a return for.

18. Q. Would that class of people not resent a cess rate upon them?—A cess like that would not be noticed. It would not be appreciated. It is something intangible and they never dispute anything of that sort.

19. Q. As to these two new sluices, if they were carried out and the water brought there, would the whole district be benefited?—Yes. I quite believe in irrigation, and believe every place would be benefited.

20. Q. Would it not be sometimes objected to on the ground that these rivers are the drainage lines of the land?—These rivers carry away the drainage of the country as well as get water from the hills.

21. Q. Would it not often be the case that those who own highlands would want the rivers banded up to get the water up to their highlands, while those on the lower land would want the water carried away?—That was the difficulty that we used to have at the time when this scheme was started originally. It was divided among half a dozen planters. I banded up at the bottom here, and Mr. Reed, who was the other man, wanted the water carried away. I got no water. Then the canal authorities made a scheme for the overflow regulating how much was allowed to run over. They regulated how much would keep the *bunds* full, and they regulated it in that way. I do not think the difficulty is such that it could not be got over.

22. Q. But are there not times when the owners of highlands want the water banded up and the owners of lowlands want the water carried away quickly?—I do not think that would be any objection to the scheme. There would be no question of that kind, except in individual and small instances, and I do not think it would be a sufficiently large objection to interfere with the scheme.

23. Q. Don't you think there would be many owners who would have to pay cess and who would get no benefit?—I would not get it from owners at all. I would simply make the owner collect it just as he does the road cess or anything else: it is only for the benefit of the people: owners under the settlement cannot increase the rent on the strength of irrigation.

24. Q. But if you take it from the ryots there necessarily must be some ryots who do not get any benefit?—The majority would; the minority might not. It would simplify matters so much that I should feel inclined to put a cess upon the whole district.

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25. Q. The minority would have to be respected?—That is true; but if you limit the collections to the portions irrigated only, it would mean numerous staff, a great deal of friction, and some people having to pay very much larger and heavier rates than they would like.

26. Q. Those who pay a heavier rate would be the people who get the greater benefit?—True; but taking everything into consideration, I think he would be prepared to pay a little more definitely—a sum which he knew could not vary, and which it would not be at the option of any individual to vary in the slightest degree. He would be prepared to pay a small sum every year rather than a large sum occasionally which might vary and he would not know whether it was correctly or incorrectly assessed.

27. Q. If you take a cess like some people who do not get will say—"I am paying a cess and I do not get any benefit; I want you to put water on my higher land?"—That is true, but once you establish the fact that the water can be obtained regularly, I believe all concerned would come into a much greater extent than they do now and make their channels and cross-cuts. Irrigation is one of those things that grows tremendously. Once they start it they are the most wonderful irrigators in the world; that is, where they take to it themselves.

28. Q. I suppose they would make earthen *bunds* on the rivers?—That would have to be in the hands of whoever was in charge of the canal; it would not be well to allow individuals to make *bunds* of their own free will.

29. Q. The man in charge of the canal would have to have absolute control?—He would have to be; that we found out.

30. Q. (The President.)—There are a large number of English zamindars here?—There was a great number at one time. When we guaranteed Rs. 40,000 for this, I was one of the original guarantors, but you must look upon that as gone now practically. Don't take that into consideration.

31. Q. If so, I fear a great deal of the efficiency of the District Board is gone?—There would still be a sufficient number to advise them.

32. Q. I suppose the District Board of Saran would be a most excellent one having a number of intelligent people upon it?—I do not think it is very different from any others in Bihar.

33. Q. (Mr. Muir-Mackenzie.)—How long ago is it since you were in Saran?—I left it about ten years ago.

34. Q. How long were you there before that?—Fifteen years.

35. Q. During that time what was the largest area irrigated?—It is such a long time ago that I could not give the figures.

36. Q. Was it over 10,000 or 20,000 acres?—It is such a long time ago that I prefer not to go into details.

37. Q. Supposing the scheme was carried out on the lines you suggest, how large an area do you suppose might be irrigated?—I prefer not to go into details.

38. Q. Can we hope for 10,000 acres?—That would be less than 20,000 *bighas*. More than that; I should say about 100,000. It is about 60 miles long from Sonapore to Naran.

39. Q. I ask you because we have had very varying estimates?—That is my reason for not giving particulars, but there are three large streams which run parallel to each other and only 4 or 5 miles apart, but each of them is not less than 30 miles long.

40. Q. I think the most sanguine estimate is 100,000 acres. The district consists of 2,000,000 acres, so that this scheme, even according to the most sanguine estimate, will only benefit 5 per cent. of the district. Do you think it would be just for a scheme which benefits only 5 per cent. of the district to place a cess practically over the whole district?—Yes, under certain circumstances, in the same way as you put on the road cess. Many people do not derive any benefit from the road cess. The benefits of irrigation is very much more localised. I think if the scheme were an established fact the rayats would increase their area very much by making channels themselves.

41. Q. I understand 100,000 acres was the highest estimate that was given to us as the extent that would be irrigated with all extensions?—I would not like to say anything about figures, because it is such a long time since I left the district.

42. Q. Supposing we took 100,000 acres to work upon, that would only irrigate about 5 or 6 per cent. of the

district?—The cess would not be an excessive thing. It would be a very small amount.

43. Q. This turns us to another point. You said in the case of the rivers that they ran deep in the lower part of their course, although they are rather shallow above?—They get deeper and deeper as they get lower down.

44. Q. Is irrigation possible in the lower reaches?—Yes.

45. Q. Do they require a high level?—Yes, but they do it. In some instances I have seen they have five lifts when they lift with the old dome and the lever. There are certain places where they always irrigate whether good years or bad years, and if water is available, the rayat takes advantage of it.

46. Q. Have you seen much well irrigation in Saran?—Yes.

47. Q. Do you think that one of the results of this scheme would be the raising of the level of water in the wells?—Yes, only in places at a short distance from the river, but not to any considerable extent.

48. Q. (Mr. Rajaratna Mudaliar.)—To revert to the cess. Supposing the area commanded was 200,000 acres, and you are able to supply irrigation for only 100,000 acres, would you confine the cess to these 100,000 acres or levy it on the whole 200,000 acres?—If you do it on different lines and divide the district into irrigated and non-irrigated portions, then you might separate the latter portion and exempt it.

49. Q. I limit the area to that part which is regarded by the Public Works Department as commanded?—If this area is Dowry, I would levy a cess for all; if it is the other part, I would exempt that part.

50. Q. But if the supply were limited, would you fix the cess upon the area that you could irrigate?—I think not. I think irrigation would be caused to the people who would not in the meantime benefit by it.

51. Q. If the District Board takes up the management, what funds would be available for irrigation works?—In the first place, irrigation would not be able to pay for itself.

52. Q. Then how would the District Board manage?—If the scheme was made over to the District Board, I presume that Government would advance the money for it. It would work out of capital until the scheme became a working one. Then afterwards the establishment required for the supervision and up-keep of the canals would be paid out of the revenue. But I do not think the District Board could pay for the up-keep of the establishment unless it has improved very much since I remember.

53. Q. It must have separate funds for this purpose?—It must have separate funds, but it is quite capable of managing it.

54. Q. In Saran we have only 140,000 acres under well irrigation. I find this in one of the statements furnished by Government?—I fancy it is a big well-irrigated district. I have never seen so much well irrigation as I have seen in Saran.

55. Q. Is there much scope for extension?—I doubt if more wells could be made. The wells in existence could be increased and improved. I do not think there would be much scope for new wells.

56. Q. Even if loans were liberally given?—I do not think they would make many new wells, because it seems to me that they have made as many as they can, but I think the existing ones can be very much improved.

57. Q. (Mr. Allen.)—Did you dig any wells yourself?—There were a great many dug in our villages.

58. Q. What kinds of soil did you come across?—It would never be the same in any two villages.

59. Q. Did you find different kinds of soil and sand?—Beds of concrete and sand and sometimes four different kinds of soil in each well. It appears to me that no two villages were alike.

60. Q. Is South Bhagnapur a good country for wells?—Practically there is no well-irrigation in South Bhagnapur.

61. Q. Can you explain that; has it anything to do with the soil?—No, I cannot give any reason for it; but I know that, as a matter of fact, in this part there is no well irrigation done except here and there a little garden irrigation. No rayat irrigates with wells. He irrigates a little in the south for sugarcane here and there.

62. Q. In Saran do they always stop a well on a clay stratum?—I do not recollect. I cannot say, but there were

all different kinds of soil there. Sometimes you come to a bed of limestone and concrete. When you do, and once you get through, it is supposed to be a good well.

63. Q. (*The President*.)—You also know North Bhagulpur well?—I know the south very well.

64. Q. Bhagulpur is on both sides of the Ganges?—On both sides.

65. Q. Do you know the north well enough to compare it with the south?—No, I do not know it sufficiently well to make any comparison.

66. Q. What are the districts in the south?—In the south there is Bhagulpur, part of the sadar district and the sub-division of Bankura.

67. Q. And Monghyr?—It is on the other side on the north.

68. Q. Do you consider that country as lying within the famine range?—The southern part is colored slightly on the famine map, but I think it is free from danger of any kind. It is tinged blue on the map, but I do not know any district which is, in my opinion, so very free from the famine as the south.

69. Q. Is there much existing irrigation?—A great deal. It has the great good fortune of having along the southern portion of the district several rivers, the spill from which enables the water to run freely all over.

70. Q. These rivers, I suppose, take their rise in the highlands of Chota Nagpore?—On the borders of the Sonthal Parganas. They dry up in January, but there is water enough sufficiently long almost every year to do the rice cultivation.

71. Q. But they have a system of *pains*?—Yes, and they are most wonderful workers. They have got water at proper levels and they will carry it all over. They have a system of syphons that carry it all over. The most wonderful syphons are made of Turtaris. They have many *bunds*. For instance, they have 210 *bunds* in Lakhimpur.

72. Q. Are these *bunds* renewed every year?—Whenever necessary.

73. Q. You mean *bunds* across minor streams?—Yes, to store the water where it comes out of the *pains* and channels. There is one thing I would suggest if it was possible, and that is legislation about the vested rights of zamindar in water. (Witness then proceeded to explain to the members on the map what the difficulties were when antagonistic proprietors prevented their tenants from getting water.) I do not know whether the question of easement would come in; but if there was any system of this kind, I feel confident that many large areas that are now almost dependent upon the rainfall could be irrigated in the south of this district. In fact there would be no portion in the south of this district that would be left unirrigated.

74. Q. Are there any large number of *pains* like yours?—Not many. All these *pains* could be made to irrigate miles and miles. I could carry water from these 20 miles if I saw any chance of a fair return. If this was my own property, I would have done a good deal, but you know the native proprietor. He does not like any man to get the better of him, or to get any advantage from him for nothing.

75. Q. Is there much dispute as to putting *bunds* across the river?—I think not. I have had no personal knowledge of that, because all these lands here are my own property.

76. Q. South Bhagulpur is extensively irrigated?—Yes, and I may mention that in the south of this district you may take it that well irrigation is practically nil. There are a few doing garden produce and some doing sugar, but there is no well irrigation to speak of. There is in Bankura 4,060. All that is rice. I was only looking at it yesterday with Mr. Williams, the Collector. I would not put it down at anything like 6 per cent. and should think that Mr. Williams will agree with me.

77. Q. (*The President*.)—There appear to be perpetual disputes about *pains*; do you think it would be desirable to give the Collector summary powers of dealing with these?—It is very difficult, and vested interest in these *pains* are such difficult things that summary powers would not do; but if there is any scheme by which the whole thing can be taken over by the Government, I think it would be a good thing. I would like to see everything connected with irrigation put in the hands of the Government. The difficulty of the ordinary zamindar is to get ready money to enable him to go in for a big scheme.

78. Q. Does he ever borrow under the Land Improvement Act?—No.

79. Q. Why not?—People do not know much about it. It is really true that it is not well known that there are facilities for getting money. Practically no one knows about it here. I am also talking about the Sonthal Parganas and in some places on the borders of it.

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80. Q. Is irrigation required every year?—The south of Bhagulpur is irrigated every year, and it is only one crop. They simply irrigate for rice. The land gets so hard that they cannot irrigate a second time after the rice. No gram or anything like that comes up after the rice. It has only one crop.

81. Q. Do you think that, generally speaking, the *pains* and *bunds* are in good order?—They are kept up, but I would not say that they are in good order.

82. Q. Is it any person's duty to keep them up?—Nobody's definite duty to keep them up. No one is bound to keep them up. The zamindar does it as he finds himself in funds. As for the zamindar in the Sonthal Parganas it does not matter how much he expended; he would not derive any benefit from any expenditure. We could not get any enhancement. The whole district is settled by Government at certain rates.

83. Q. He will get the whole benefit at the next settlement?—Yes, he may.

84. Q. Could not they get water-rate?—This is a non-regulation province. Rates and everything are settled by Government. I do not think you could have any big scheme in the Sonthal Parganas. There are no plains, only little valleys.

85. Q. (*The President*.)—And in Southern Bhagulpur?—It is so well done privately there that you do not want a big scheme. It is a very exceptional district. It is very different from Saran.

86. Q. (*Sir Thomas Higham*.)—A landlord is required to get over the difficulty between different owners?—Owners sometimes are quite indifferent.

87. Q. What are the points of particular difficulty?—In this particular instance that I am giving now. Here is the map. This river runs down here (shows on the map); people who irrigate this country here would have you start your channel sufficiently high up to let the water over here by gravitation. The only place to begin is here. This man says "why should I have a very expensive work here unless I can compensate myself?" They do not know whether they will get the water here. This man may ask you to give him the water down here, but this water may never reach him, for people steal it in the meantime. If he knew that he could realize his money, or that he was compensated in some manner, he would lay out money and do things properly.

88. Q. Would you propose that the Government should have the power to acquire the land for such works?—The acquisition of the land would be nothing; that would be a very simple, if not altogether an inexpensive, affair. They could acquire it under the Land Acquisition Act.

89. Q. You could only acquire for Government work?—Supposing these people (points on the map) say this man here should not acquire it but Government can.

90. Q. What legislation is necessary to facilitate these things being improved by the zamindars? A man has a right to profit by the fact that the neighbours get water from him?—This has hurriedly sprung upon me. I have never tried to work out a scheme by which this can be equitably managed. I do not think the difficulty is to get land. The difficulty is that, when you have improved it, this man will take the whole of it and it will never reach down here.

91. Q. Has he a right of way in the land?—He has by gravitation. All that he has got to do is to put his toes through it and he gets his land irrigated.

92. Q. He would be made liable for taking water?—That is where the difficulty comes in. He will say "I do not want the water. The beastly thing has burst over me." I have never worked it out. In a general way I think that it would be a benefit to the country if the water could be got when wanted. The trouble is that these vested rights come in. I have no time to work it out. I may try to work it out. I have got no figures. I am just giving a rough local knowledge. I have put a *bund* to let the water turn in across this stream. My *bund* is here. We can get as much water as we like, and it is generally available up to the lowest water time.

93. Q. How many acres have you got?—I am not prepared to say that. The channel is our own property and is about 4 miles long.

Mr. W. G. Macgregor. 94. Q. Is it all your own?—It is all our own and through it are numerous cuts. There is another channel in this property running almost parallel.

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95. Q. You do not put water over this?—Another man has got this. Many years ago a neighbouring zamindar got permission to make this channel in our property. We never interfered with it.

96. Q. You never cut his *bund*?—No.

97. Q. His bank never breaks?—Our bank sometimes breaks, but his difficulty is with this silting up. He is quite willing to clear it out, but the river is unfortunately leaving him. He has got permission to make this channel.

98. Q. He can put silt where he likes?—There is absolutely no objection of any kind. The river is the only difficulty.

99. Q. One great difficulty of these schemes is that no one has any ready cash?—As a rule, a zamindar has no ready money. I am talking of a number of those with whom I have dealings. Generally a zamindar finds it difficult to get Rs. 30,000 to Rs. 40,000 to do a fairly big and prominent thing. Now, as regards this particular channel to make it large and thoroughly good and to put it in working order with a sluice gate would cost about Rs. 15,000 to Rs. 20,000 to put it in a thoroughly good state of repair. There would be no difficulty in raising this money if we were certain of being able to recover. As it is we let in sufficient water to do our own zamindari. We could with a little more expenditure irrigate a much larger tract than our own.

100. Q. Is there scope for many works of this kind?—In this district the difficulty is very easily got over. I know of no place where the difficulty will be more easily got over.

101. Q. The question of funds may be got over by Tikari advances?—That would be to the rayat. Supposing I apply for an advance to improve this, to let in the largest quantity of water possible depending upon working down here, then all these people would pay me nothing. They would combine with this man who would apply for the water and they would take it. That is the trouble.

102. Q. You mean that it would not pay you at all to apply for an advance?—Not for a large one. It might for a minor one, but not for a large one unless we had the means for collecting.

103. Q. Unless you had some means of preventing your water being stolen?—Yes, a little more expeditious than the Civil Court. It would simply land us into vested rights and all kinds of long business.

104. Q. Were you in the district in the famine of 1897? Were the relief works undertaken?—There were a few relief works in the north. I would put it down as a mere scarcity. I would not put it down to famine.

105. Q. What did they do?—Made tanks and roads and *bunds*, but very few *bunds*. I think they were simply to give labour in digging holes in the ground. I should think that the southern parts of the districts may be put down as immune, as Mr. Comings said that it could never be called a famine tract.

106. Q. Where is the insecure part?—In the north there may be strips, but you cannot take that into consideration.

107. Q. (*Mr. Muir-Mackenzie*).—Would you like to have a record-of-rights in these streams prepared for you?—Very much.

108. Q. At any rate if you had a full record of existing facts, even if you cannot have a full record-of-rights, it would be very valuable?—Yes, it would simplify a great many things. It would be a simple matter to make this record.

109. Q. Has the record-of-rights been introduced?—There is no record-of-rights there. It is a non-regulation province.

(*Mr. Allen*).—We are making one in the north now, which will come down to the south. That does not interfere with the canal part.

110. Q. (*Mr. Muir-Mackenzie*).—You fear giving the Collector summary power to make an order regarding rights in water?—If there was a record-of-rights I would not

be afraid. It is only at present when it is all vague and doubtful.

111. Q. Would you be glad to have these matters about interest in water and rights of water which are now referred to the Civil Court tried by the Collector instead?—If the record-of-rights is completed.

112. Q. But the Collector even now has the power to make an *ad interim* order where a breach of the peace is feared?—I have had nothing to do with anything of that kind myself.

113. Q. If these matters of dispute are settled, then you think zamindars will take advances in considerable matters of improvement?—I think zamindars and rayats and all would take advantage; I think it would be for the benefit of the community at large that something of this kind should be done.

114. Q. What return does the zamindar get for water, increase of rent or what?—In his irrigated area rates are high. They pay a higher rate for lands that are irrigated.

115. Q. Simply the rates of land are high?—Yes. These lands are more valuable.

116. Q. In any instance does any zamindar charge for water?—He is always glad to give his rayats water. It is always his object to give his rayats as much water as possible, because he improves the land. It is only the other rayats outside the zamindari that he charges.

117. Q. Then what you contemplate is that zamindars could get money to make improvements so as to give water to rayats of another zamindari?—Yes, if there is some system by which this distribution of water could be regulated, I being the first person interested in this, I would like a larger portion of the profits. I mean these people have to compensate me by allowing them water.

118. Q. For allowing the water to go across your land. —Yes, I having property in this place.

119. Q. By virtue of having property in this place do you claim a monopoly?—I do not claim any monopoly. If I had banded up the river and stopped the flow, then the people down here might come in for easement. There are many instances like that. This is only one of them.

120. Q. What occurs to me is that, if this zamindar or the neighbouring owners, if they could, through this channel or some other channel passing over your land, get water for their tenants, their interest might be to acquire a right of way over your land?—How could they acquire their right of way over my land?

121. Q. The question is whether you could not give facilities?—Yes, that is the thing.

122. Q. The arrangement which you proposed gives you a monopoly of water? I admit that the greater number do not derive the benefit that they ought to. At the same time this man, owing to his very advantageous position, ought to be compensated over and above the mere acquisition part of the land. There ought to be some kind of legislation.

123. Q. Do you take the water from the *pains* going straight on?—It is all gravitation in this particular instance; but in other places they fill reservoirs. In the south of the district it is practically all gravitation.

124. Q. Does this supply not fail you in all years?—I have not known it fail.

125. Q. You have said that there is little more than scarcity in the district?—I think that at one time there were nearly 22,000 persons on relief?—I think that you can get that at certain times in any year.

126. Q. You mean that relief is given very freely?—I was not saying that the Government is to blame; but there are certain times when you could get people always. Sometimes the outlook appears as if there was going to be something more than scarcity and you must anticipate the worst. I think the well irrigation figures are wrong.

(*Mr. Williams*).—Yes, they are quite wrong.

127. Q. (*Mr. Allen*).—What are your last figures?—65,000 acres?—I should say that in the south there is practically none. In the low land you did not require to irrigate for sugarcane.

WITNESS No. 68.—BABU HARBALLAB SINGH, Mouzah Bahado, Bhagulpur.

1. In reply to the President the witness stated that he owned property in the northern part of the Bhagulpur District. The people do not irrigate every year. Where they do irrigate the irrigation, even for rice, is chiefly by lift. Both rice and *rabi* are much benefited by irrigation. A canal could be made from the Kosi which runs at a high level. If a canal were made, rice would be extensively substituted for *rabi*. If a change is made only when the water is actually taken, Government might not be recouped in full for the cost of making and working a canal, but a cess could be imposed on the lands irrigable by the work. Wells cannot be made owing to the depth of the sand in which there is no clay stratum on which the well *kerb* could rest.

2. There is some irrigation from tanks which do some good even in a dry year. There are many disputes about water. There should be a special Act authorizing the Collector to settle these disputes.

3. (To Mr. Muir-Mackenzie).—Water from a canal would be taken every year for lands converted from *rabi* to *aghani* and also for *rabi*. There would be a large area of converted

lands—more than half the area of the villages. In the northern part of Bhagulpur famine was much worse in 1873 than it was in Darbhanga.

4. There are very few wells which irrigate *china* and *marua* at transplanting time. Some sugarcane is irrigated from rivers, not from wells.

5. (To Mr. Rajaratna Mudaliar).—I take no increase of rent on account of irrigation, although the law allows it. I gain by securing existing rents and increasing the welfare of my tenants. The fact that irrigation is by lift or by flow makes no difference in the rent.

6. (To Mr. Allen).—People do not take *takavi* loans readily, or rather do not get it readily. They have much trouble in getting it and have to go backwards and forwards ten or twelve times and pay a commission on all they get. I would gladly be an agent for giving out *takavi*. It would be a great convenience to the cultivator if trustworthy zamindars were allowed to distribute *takavi*. The Dhimra scheme is not promising; the river dries up when water is most required.

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WITNESS No. 69.—The Honorable Mr. W. C. MACPHERSON, C.S., Secretary, Government of Bengal, General and Revenue Department.

Note on the question of imposition of an owner's rate with special reference to the Tribeni Canal Scheme.

Mr. K. B. Buckley's letter No. 245, dated 20th February 1900.—If it were contemplated that under this scheme a large area of land at present uncultivated and unoccupied would come under cultivation. I think that it might be feasible and worth while even without legislation to come to an arrangement with the landlords that the canal or distributary will be made on condition that an owner's rate shall be paid in addition to an occupier's rate, in the case of lands to be hereafter brought into cultivation in villages which may be scheduled. A check of the field maps and *khasras* of the scheduled villages previous to bringing the water and at intervals after bringing the water would be required.

The ground for such an arrangement would be that the canal would give rent value to land which at present has no such value. Such arrangements have been made with landlords for protection afforded by embankments.

If registered *kabuliyats* be obtained from landlords, sums specified could be recovered under section 7, sub-section (1), clause (i) of the Certificate Act. But probably it would be best to legislate to facilitate such recovery.

2. I do not clearly gather from the papers whether the estimate of new cultivation should be put at 15,000 acres or at something more. Mr. Toogood in a letter, dated 6th January 1898, took the culturable but uncultivated area as 30·5 per cent. of the whole of the tract; but of course all of this may not be irrigable. Fifteen thousand acres at 6 annas an acre for owner's rate would give less than Rs. 6,000 a year, which is hardly worth considering with reference to the cost of the scheme (37 lakhs capital and 1 lakh annual). At least it is hardly worth considering so far as determination of the question whether the scheme shall not be carried out.

3. When tenant right has accrued in land, the question of imposition of owner's rate becomes in these Provinces quite a different question.

If the landlords should be willing and perhaps even if they be not willing, there might be great advantage and no sufficient objection to an arrangement whereby they should be required to collect and pay the occupier's rate [see section 82 of the Bengal Irrigation Act, III (B.C.) of 1876] just as they collect and pay the road cess, after allowance to them of a reasonable percentage for cost of collection. In the case, however, of lands already occupied by tenants, I should regard as unsound and vicious any proposal made at the inception of an irrigation scheme in Bengal to authorise landlords to recover from tenants an owner's rate independent of, or in addition to, occupier's rate. A proposal, e.g., to take 6 annas owner's rate from the landlord and to allow him to raise his tenant's rent by 12 annas an acre, the tenant also paying occupier's rate, appears to me to be indefensible. The right of the occupancy tenant in Bengal is to hold his land at a fair rent. The landlord's right is to receive a fair rent. When a water advantage is added, let the tenant pay fully for it by way of occupier's rate. Until there is a full and

safe return to the Government for the expenditure and an assured return of the value of his rate to the tenant, there is no sufficient reason why the rent payable to the landlord should be increased—much less reason why the tenant should pay 12 annas more rent in order that Government may get 6 annas. If the tenant can afford to pay 12 annas more for his increased yield, and if 12 annas be wanted to pay for the expense, let the occupier's rate be increased by 12 annas.

4. The abstract question whether a Bengal landlord who has leased his land to occupancy tenants has an equitable right to share in the profits of an irrigation scheme not carried out at his own expense is, I think, an arguable question. The law gives him no such right at present. When Government has borne the cost of the irrigation scheme, I should be inclined to grant the question in favour of the landlord, but only after securing fair interest, if not profits to Government and full value to the rayat in the first place. The landlord who stands to lose nothing should certainly be looked upon as the smallest partner in the profits. Where by the advent of canal water areas in which no tenant right has accrued are brought under cultivation for the first time, the landlord at once gets his share of the new profits. This is because he has not previously parted with the tenant right. When tenant right exists in irrigated land, an equitable adjustment might be for Government to surrender in favour of the landlord a portion of the occupier's rate, when such rate, not being excessive from the rayat's point of view, brings an income larger than it is necessary for Government to take on account of interest or profits. There need be no difficulty or complication, I think, if after a period of successful working of an irrigation scheme and with an assured future, Government were to announce that it would reduce its water-rate from Rs. 2·8 to Rs. 2, and that out of the 8 annas surrendered 4 annas is to be the rayat's gain and 4 annas is to be paid by him as additional rent to the landlord. I would legalise such a declaration if a time should come for it, but would await such time.

5. I have the following additional remarks to offer:—

(1) As to the amount of the occupier's rate.—Mr. Buckley may be right in saying that cultivators are shy at first in taking water, and that they may have to be coaxed at first by free water or by low rates. And it is to be remembered that a cultivator in North Champaran pays a low rent, probably a good deal less than Rs. 2 an acre on an average. To a cultivator paying such a low rent, Rs. 2·8, as proposed for *aghani* rice, must seem a big additional rate. But it will be seen that it is not the local opinion in Champaran that rates need be low to start with. In Orissa, where the usual rate is now only Rs. 1·8, rayats were no doubt frightened at first; but in Orissa the canal authorities began by demanding Rs. 3 to Rs. 5 an acre. Accepting Mr. Buckley's estimate in his note of October 1899, that there is a loss equivalent to a total loss of the rice crop once in

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four years in the area of the Tribeni project, and looking to his estimate that an acre of good rice is worth Rs. 50. 50, I think that a rayat would soon learn to pay Rs. 2-8 x 4 = Rs. 10 to save Rs. 50. I would certainly not begin with a lower rate than Rs. 2, and should hope to rise to Rs. 2-8 very quickly. The reason why only Rs. 1-8 can be imposed in Orissa probably is because Orissa ordinarily has abundant rainfall and the rayat does not care to pay more for insurance. The rainfall in Champaran is far less to be depended on.

(2) *As to the landlord enhancing rents on account of the water advantage.*—I do not believe that the landlords will be able to do this to any large extent in an area where a record-of-rights has been made. But I have no doubt that the landlord would be still more deterred from attempts in this direction if the Government were to make proclamation, or if the Collector were to issue notice, to the effect that irrigation of lands from Government canals is not a legal ground for enhancement of existing rents. In 1866

a proclamation was made in Orissa to the effect that irrigation would not be made a ground for increase of rents at the next settlement; and the Settlement Officer has reported that this proclamation had a restraining effect on landlords. Mr. Buckley says that rents were increased after the canal water came in the Sone area. But the Sone area had no record-of-rights. I am not aware whether any prohibitory proclamation was published in that area.

(3) *As to the argument that the landlord's existing rent will be safer by reason of canal irrigation.*—It will be noticed that the Champaran reports do not attach much value to this argument, as they allege that rents are only suspended in a bad year not remitted. Mr. Maddox has estimated in Orissa that landlords collect 95 per cent. of their demands in an irrigated area and from 85 to 95 per cent. in the unirrigated area. I doubt myself whether Bihar landlords remit anything important in the case of lands paying rent so low as Rs. 2 an acre and less.

1. Q. (The President.)—You are Secretary to the Government of Bengal?—Yes, Officiating Revenue Secretary. I wish to say that I am in no way authorised to speak for the Bengal Government, and that I have not received previous notice of questions.

2. Q. What districts have been in before?—I have been District Officer in Muzaffarpur, Nuddea, Rajshahi, Purnea and Saran, and I have visited most of the districts in the Province in connection with the land settlements of which I was in charge for five years. I had my longest district experience in Saran.

3. Q. Of the districts which you have named Saran and Muzaffarpur are the only ones that come within the range of famine?—I think all the five districts are down in the list of districts wholly or in part liable to famine, but Saran and Muzaffarpur are more especially liable and Muzaffarpur more than Saran.

4. Q. This is, I suppose, on the north side of Muzaffarpur?—The Sitamarhi Sub-division on the Nepal border is especially liable to famine.

5. Q. Were you long in Saran?—For over two years.

6. Q. I do not know whether you heard the evidence of Mr. Macgregor given this morning?—I heard some of Mr. Macgregor's evidence.

7. Q. It has been strongly represented to us by people in Saran, and we have heard two opposite sides of the question that it would be just and equitable to lay a small cess for irrigation upon the district or a part of it. We took evidence at Muzaffarpur on this question and the opinion of those who came before us was that the cess could be fairly levied. Mr. Growse and Mr. Hare thought so. Since then we have heard Mr. Slacke, the Commissioner of Chota Nagpur, who pronounced very emphatically against it?—I would go rather with Mr. Slacke so far as I read his evidence in the newspapers. In Saran the people remember that an embankment cess is in force. A strong Collector, Sir Antony MacDonnell, imposed the embankment cess on every estate in the district. It is a small cess and there is a great deal to be said for the whole district bearing the burden of it, because if the whole of the district is not protected by the Gandak embankment, the greater portion is. So far as I know there has not been any complaint from the zamindars of any portion of Saran about the embankment cess that all do not derive benefit from the embankment; but in the case of an irrigation cess one would have to carefully consider who would benefit from the irrigation works. I do not think there is any precise estimate before the Government as to what the area is that would be irrigated by the so-called Saran canals if they were extended and put in working order.

8. Q. I think the highest estimate we have got is 100,000 acres, and I imagine it is merely a matter of money to make more distributaries, for there is a plentiful supply of water from the river?—It has been stated that the largest area ever irrigated, in any year, from these canals in their unfinished state was 21,000 acres; and Mr. Buckley suggested a doubt whether water would be forthcoming when it was most wanted in the *sotas* of channels, that is in October. I should say it would be unjust to make the whole of Saran pay for irrigation possibly covering 100,000 acres.

9. Q. Mr. Macgregor remarked this morning that one might draw a pretty clearly defined line between lands that would be benefited and those that would not. Do you think that would be possible; it would mean throwing outside the line the north-west portion?—It would no doubt be possible to say, if levels

have been taken, that the irrigation would benefit such and such villages, but 100,000 acres is nothing compared to the area of the district; 2,300 square miles, or thereabouts.

10. Q. The argument brought before us was that the advantage to the district would be so much, that no objection would be raised. That is, if water can be brought into the canals. Mr. Macgregor's idea was that the whole of the country would be commanded. I told him that Mr. Ogilvy, Manager of Hawka Estate, had recommended two more sluices here, and Mr. Macgregor said that the whole of the district would be commanded and benefited and the cess would not be unjust. Of course the cess would be a very small one?—We have no precedent for such an irrigation cess in Bengal. When it was proposed to legislate about 25 years ago to impose a compulsory irrigation cess the Bill was dropped on the ground that the proper way for Government to recoup itself for such expenditure was to make a bargain with the people who took water.

11. Q. If one could be certain that water would be required every year, you could face the question of return from the water-rate from the area irrigated?—That is what we are not certain about. First of all we want a scheme showing what can be done.

12. Q. Can you count upon people taking the water regularly?—It is extremely difficult to say. Our experience in Orissa shows that it is only slowly that the rayats have appreciated the insurance of the water. In Orissa the rayats for a long time were very slow to take the water. They trusted to the rains. The rains fall only occasionally and they say the water is no good to us if we get the rain. I think it would be very dangerous to make such an assumption as I heard Mr. Macgregor make as to everybody rushing to take the water.

13. Q. If one can draw a comparison from the Sone irrigation, it rather goes the other way. The people of the Sone area are anxious to take water?—That part of South Bihar is much drier and thirstier than North Bihar.

14. Q. (Mr. Muir-Mackenzie.)—The rainfall of Saran and Shahabad does not seem to be very different if you take the Buxar and Chupra figures?—The districts are large. Shahabad is hotter than Saran and has a different soil.

15. Q. (The President.)—Have you any suggestions to make as to any reasonable course the Government might adopt to give irrigation to Saran without going to extravagance?—I think a survey is preliminary to anything. We want to know what the expenditure would be; what water can be got into the so-called canals; whether it can always be counted on in October, and what area could be commanded.

16. Q. You say Mr. Buckley thought water would be insufficient in the Gandak?—The suggestion is, I think, not that the water in the Gandak would fail, but that water could not always be got into the *sotas* and channels in October. Then we want to know what area the water can be distributed over; what is commandable, the cost, and there is the question whether the rayats will take the water if the rate be a voluntary rate. All these are problematical; and it is possible that there may be difficulties in the slope and level of the country. I do not speak as an engineer. There is a general fall to the south-east; but it may be found that the existing canal beds are deep and below the level of many villages.

17. Q. I don't think the circumstances of the case are such that one could make a strong recommendation to the Government to carry out works which would not pay working expenses?—Saran is a three-harvest

district and it is more immune from famine than the other three districts of North Bihar because of the three harvests; also because the people emigrate largely; they leave the districts for work and bring back or remit to their families considerable sums earned as wages.

18. Q. The conclusion that our information appears to lead to is that we shall have to leave Saran severely alone?—I should be very sorry that the question should not be thoroughly threshed out as to what can be done and at what cost to improve the Saran canal and what can be offered to the cultivators and at what rates.

19. Q. What proportion of irrigation in the district would justify a cess? If one could irrigate every year 1 or 1 of the district, would it be justifiable?—No. I do not think that a general cess for such an amount of irrigation would be justifiable. We have no such cess or owner's rate for irrigation in Bengal, and I believe it has been abandoned in the Upper Provinces.

20. Q. (The President to Sir Thomas Higham).—Has the owner's rate been abandoned in the Punjab? Mr. Mackenzie says it has?—Yes.

(Witness).—In Orissa we have got some return for the expenditure on irrigation by the increased land revenue and we have just increased the water-rate paid by the occupiers from Rs. 1-8 to Rs. 1-12 an acre.

21. Q. (The President).—Turning to the question of *takari* advances, do you think that the system could be improved?—I think the system is capable of improvement.

22. Q. Do you think our system is too rigid?—The difficulties that occur to my mind are those that were mentioned by the Maharaja of Sonbarsa. The *rayat* has a difficulty in persuading the *haldar* that his is a proper case for an advance. Preliminary enquiries have to be made before an advance is given as to the security, and then too often happens that the subordinate officer who makes the enquiries is corrupt.

23. Q. That has been the tendency of the evidence we have had elsewhere. Very often the thoroughly conscientious officers have been afraid to take the responsibility and there have been delays of months sometimes. We have been told more than once that if a Sub-divisional Officer was told off for the purpose and took about with him a bag of rupees, a great deal could be done?—That is an improvement of the *takari* rules which the Bengal Government has recommended to the Government of India, viz., that the money should be disbursed in the villages by responsible officers.

24. Q. Would it mean an increase in the establishment of district officers and superior officers?—You were speaking in the case of famine?

25. Q. I am speaking of ordinary advances?—Yes. If it was to be done properly, it would need an increase of staff. The officers making the enquiries should be gazetted officers working under the Collector.

26. Q. Then you recommend some relaxation of the present rules?—Yes, they require amendment.

27. Q. In your experience of so many districts you must have seen a good deal of well-irrigation? In some there is a remarkable absence of wells, and in others they are numerous?—Yes. Well-irrigation in this Province is confined to Bihar, including some of the districts of Bhagulpur Division and Chota Nagpur, I should say.

28. Q. Is there any distinct physical reason why it should be confined to those parts? We were told in Chota Nagpur that the *rayat* was too lazy to draw up water; and that he considers it too much trouble that the wells were very expensive, and that sometimes there was a great depth of sand and no clay to be found?—I think it is a matter of soil and rainfall; tanks take the place of wells in Bengal proper so far as regards watering of men and cattle.

29. Q. Tanks must always fail when there is a deficiency of rainfall?—Yes, to a large extent. It is not my experience that tanks are largely used in Bengal for irrigation.

30. Q. These tanks are dug in the soil apparently. They are not the kind of tank which is made by closing in a valley along a hill?—In Bengal they are ordinarily excavations.

31. Q. (Mr. Muir-Mackenzie).—To revert to the point of a cess in Saran, would you be prepared to say that even, although illogical, and although it may not

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be altogether fair, yet, if the people do not object to the levy of the cess, you would consider it inexpedient to apply it?—How would you gauge the opinion of the *rayats* and small proprietors of Saran?

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32. Q. You would have to tell them?—There would be only one answer that they did not want to pay any more.

33. Q. I should be quite prepared to accept that except for the fact that the witnesses in Muzaffarpur were almost clamorous in saying that there would be no objection. We had not only planters but also officials, and they said that the people would not object, and that one of the principal reasons was that the cess would be so minute that it would not press on them heavily?—I should object on the ground that there was no more reason why, for the purpose of benefiting five per cent. or even twenty or twenty-five per cent. of the land of Saran, the whole district or greater part of the district should pay a cess for irrigation than that a cess should be taken from all the districts of Bengal to pay for it.

34. Q. I quite admit that the objection is valid and reasonable; but, if people are willing to pay the cess, and inasmuch as the collection of water-rate might be attended with considerable difficulty and expense, would you not be prepared to advocate the levy of a cess, if it was accepted by the people?—No, I should not be prepared to advocate an irrigation cess in Saran. I of course do not object to a water-rate paid by the occupier.

35. Q. You said that there was no complaint about the embankment cess?—That is so. The greater part of the district does undoubtedly benefit from the Gandak embankment, not only in the protection of agriculture, but also in the protection of communications. It would not be so with irrigation.

36. Q. Do you think that in consenting to the embankment cess, without making any complaint about it, the people reflected in any way regarding its operations?—Yes, intelligent zamindars make such reflections. I think I remember that an objection once came from Hatwa that a great deal of the Hatwa Raj, which occupies one-third of the district, does not in any way benefit by the embankment. I also remember that the Bettiah Raj in Champaran made a similar objection with regard to the embankment cess.

37. Q. The objection from Hatwa was over-ruled on the ground that the embankment cess did give general benefit?—There was no special reason given except as I have stated that the whole district or nearly the whole district benefits. The cess was put on every estate by a strong Collector 25 years ago, and it is small and nobody minds it.

38. Q. If an irrigation cess be put on by a strong Collector now, would there not be an absence of objection?—I do not think we would hear very much objection to a small cess such as one pie or two pies on the rent.

39. Q. You would consider the cess was objectionable, and if there was no other means of paying for the work, you would rather see the work abandoned than have a cess put on?—I want first of all to know what benefits can be conferred.

40. Q. Suppose we irrigate 100,000 acres, do you think that a cess is objectionable?—Yes.

41. Q. If the money for irrigation project could be got in no other way except by a cess, and if in no other way could you get 100,000 acres irrigated, would you still object to a moderate cess in Saran?—Yes, I should still object. But if it could be shewn to me that 100,000 acres would be irrigated and could not be irrigated by any other arrangements, I might give in.

42. Q. With regard to well irrigation, do you think that if those parts of the country where wells are suitable and well irrigation is not material, wells are as widely extended as they might be?—No, the number of wells is increasing yearly I suppose.

43. Q. And do you think that the rate of increase should be accelerated by a liberal distribution of *takari* under the Improvement Act system?—I think so. I think that it should be accelerated. It is the custom in the Hatwa Raj to help *rayats* to make wells, and the Opium Department give advances for wells. Mr. Tytler was very successful in this direction and there is no doubt there is room for more wells.

44. Q. Can you indicate any particular localities in any districts with which you are acquainted where more might be done?—I should think probably throughout Bihar, not everywhere, because in places

Mr. W. C. Macpherson, 45. Q.—But in places where rayats are backward, the soil is not suitable and there rayats won't dig wells.

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46. Q. Do you not think that in a matter of this kind an enormous amount depends upon the individual officer?—An enormous amount depends upon the individual officer.

47. Q. If you get a person to take up the subject with enthusiasm, he would influence the people?—Yes.

48. Q. Has the Bengal Government ever found difficulty in getting as much money as it wants for *takavi*?—I did not come prepared to answer this question.

49. Q. The allotment for the whole province is four lakhs for the current year?—I cannot say.

50. Q. Do you remember what it was last year?—I cannot say without looking into returns. I have caused figures to be prepared for the Commission showing the amount actually disbursed for *takavi* in the last ten years.

51. Q. But not the amounts asked for? Can you remember any case where the Bengal Government have regard this as an important question. Can you tell us had to refuse loans?—In this year. I have been Secretary to Government for one year. There has been no case of refusal.

52. Q. Do you find that all allotments that you make are generally spent by the District Officer? I to-morrow whether District Officers ordinarily spend the allotments made to them?—I think the figures have been compiled for the Commission, but if not, I can have a statement compiled showing the allotments made and the actual expenditure. These depend very much upon the character of the year.

53. Q. I understand that the improvements in the system of *takavi* advances which you advocate would be that responsible officers should themselves distribute the money. You would not go as low down as a Sub-Deputy Collector?—Yes. The Sub-Deputy Collector is a gazetted officer. They should themselves distribute the money in the villages and such arrangement has been made in Chota Nagpur.

54. Q. Is there any difficulty in distributing *takavi* owing to the insecurity or defective tenure of the rayats?—I would not say that this has been a practical difficulty in Bengal, because in Bengal we have a practice, which may also obtain elsewhere, of joining a large number of rayats in a single bond. We prefer the joint security of 15 or 20 rayats to the mortgage of the holding. We take both; but District Officers ordinarily prefer the joint security.

55. Q. Is not there a rule at present that for loans granted for improvement purposes landed securities should be taken?—I should have to consult the rules before replying. There are rules approved by the Government of India in force in all the provinces. (Mr. Allen here read the rule.)

56. Q. You do not think there will be difficulty in obtaining this collective security even if loans are largely extended?—I beg your pardon; when you first put the question I was thinking of loans to rayats which are ordinarily made under the Agriculturists Loans Act and less frequently under the Land Improvement Act.

57. Q. But loans for wells, would they not have to be given under the Land Improvement Act?—Yes, but there we would not always get joint security. We might sometimes get it.

58. Q. Loans for wells will benefit only the individual and the security would be his holding?—In most cases.

59. Q. I would point out with reference to this that Mr. Tytler in Saran in describing the success which he had in giving advances lay stress upon this—collective security—and he says he was able to get rayats to give such security?—That means that the well would irrigate several holdings. In such cases no doubt.

60. Q. You think that such cases would be abnormal?—I think that cases would be abnormal where you would get 15 or 20 rayats to give a collective security.

61. Q. Do you want such a large number?—That is an ordinary number in the case of loans under the Agriculturists Loans Act. A smaller number may suffice in the case of a well.

62. Q. You referred to the case of the tenure being offered as security and you said that the question did not present any practical difficulty and that you did not anticipate any in the future? Do you think that the matter of tenure will not present any insuperable difficulty in the future?—It does present difficulty, but this difficulty is diminished in the cadastrally surveyed districts where the rayat can produce a copy of the record-of-rights showing what his title is. There is great difficulty in finding out his rights and the area of his holding where there has been no survey.

63. Q. But where a record-of-rights is introduced that difficulty is at an end?—To a large extent enquiry is simplified.

64. Q. Is there any danger of the difficulty recurring and becoming one of great magnitude if the records are not maintained very punctually?—Of course a record becomes to a certain extent obsolete and loses its value every year, but for practical purposes for 20 years and more it will be valuable, although not conclusive.

65. Q. The record-of-rights will greatly diminish the difficulty of testing security?—Yes, it will assist in the ascertaining of details of rights in land.

66. Q. When a rayat makes an improvement would he run the risk of having his rent enhanced, or would he be safe from enhancement?—Wherever the Bengal Tenancy Act is in force he is absolutely protected as regards his improvement; that is to say, the improvement cannot be made the basis of an enhancement suit by the landlord.

67. Q. I am aware of this provision of the law; but is not it a fact that landlords get enhancement of rent?—I am afraid so in the non-surveyed districts.

68. Q. And in the surveyed districts?—Where there is a record-of-rights we believe that the rayat is much safer.

69. Q. Now about advances to zamindars. There must be some cases in which zamindars might profitably take advantage and obtain pretty large sums to make irrigation works, such as *pains*, *ahars* and improve existing irrigation works. Do you think there is any scope for advances of this character?—I should say that in Bengal, ordinarily speaking, a landlord does not make improvements. The South Bihar districts where the *bhadli* tenure prevails are distinguished by the system known as *ghilandazi*. The landlords make and maintain the *pains* or water channels and construct and repair *ahars*. These may be called improvement works; but they must also be looked on as works of maintenance. Without such works there would be no crop. The landlords occasionally take advances from Government for such improvement works.

70. Q. Is it not the case that in some districts the *ahars* and *pains* are in very bad order?—Yes, undoubtedly they are often neglected.

71. Q. Do you think the landlord could be induced to take advances more freely?—I think so with more encouragement and by selected officers.

72. Q. More where rent in kind prevails than where rent in cash prevails?—Certainly.

73. Q. Where the system of rent in cash prevails a landlord has very little chance of getting enhancement?—He has the right of enhancement under the law if he registers his improvement.

74. Q. But it is not a fact that it is very rarely done?—I would not say that. Some of the great landlords register; but registration of improvements is greatly neglected.

75. Q. And even if they registered, are not they precluded from enhancement for 15 years?—No. Under section 113 and section 29 of the Bengal Tenancy Act they can enhance the rent as soon as they make the improvement.

76. Q. Is not enhancement forbidden for fifteen years and five years?—The law prescribes periods of fifteen years in the case of occupancy and five years in the case of non-occupancy tenants between enhancement and enhancement, but there is an express exception which would allow immediate enhancement on the ground of an improvement made by the landlord.

77. Q. There are a number of Government estates scattered about the country. Do you think that irrigation works made by the landlord are very much better in the Government estates than in the zamindari estates?—I should say that irrigation works on estates under the Government or Court of Wards are better looked after than those on private estates.

78. Q. Do you think they are not better in all Government estates?—I do not think enough has been done.

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79. Q. You would like to see larger sums spent in the Government estates?—Yes. I think more money could rightly and profitably be spent on them.

80. Q. Can you say what has been the difficulty up to the present in expending money on Government estates?—I think the Collectors have too much to do. Perhaps they should have an agricultural engineer.

81. Q. Want of skilled advice?—Yes. Want of skilled advice in the Government estates.

82. Q. You would like to have more skilled advice placed at the disposal of Government in the management of estates?—Yes, I would. I do not say that the District Officers have no such advice. They have advice from the Public Works Department and District Engineers, but they want more help.

83. Q. It came to our notice in Chota Nagpur that the Deputy Commissioner wished to have rents enhanced in consequence of the introduction of improvements, and that the Board of Revenue objected on the ground that a settlement had been recently made and that a change could not be made for fifteen years?—I cannot remember that any proposal of this nature has come before the Government. There may be special reasons why the Board take this view in the case of Palamau, if Palamau be the district to which you refer. In Palamau I know that rents were considerably increased in the last settlement; and it may be that the Board think that they have been sufficiently increased without putting on anything more on the ground of repairs of *ahars*. It is a possible view of so-called improvements in some of the Government estates that there is no new improvement, but that the works are only maintenance works which it is the duty of the Government to maintain, and that therefore there can be no question of enhancing rents.

84. Q. (Mr. Allen.)—There is a question of carrying out a large scheme—a canalisation of the rivers by which the villagers would be considerably benefited; and the Deputy Commissioner therefore recommended that an additional rent should be charged. He said it would be very difficult to collect a water-rate, but it would be fair to enhance rent. The Board held that it would not be fair to further increase the rent until the expiration of Mr. Sunder's settlement?—There is no provision of law in the Bengal Tenancy Act which would prevent the increase of rent on the ground of improvement. I distinguish between improvements and works which it is the duty of the landlord to make. I should have to refer to the Chota Nagpur Tenancy Act and Settlement laws before speaking positively as to the provisions of the Chota Nagpur law on this subject.

85. Q. (Mr. Muir-Mackenzie.)—To come to the famine programmes. Have you formed any opinion as to the utility of works done during the last famine? They consist principally of roads and tanks?—Yes, of roads and tanks generally. I have not been a famine officer. I cannot speak with practical knowledge gained in famine time. Mr. Bourchillon would give you full information as to famine works.

86. Q. Do not famine programmes come before you in your capacity as Secretary to the Government?—I can say how famine programmes are prepared and dealt with.

87. Q. The principal point which I wish to know and on which you can give us information is that. Do you think that under the present system sufficient consideration is given to the prospective utility of the works, more especially for the purposes of irrigation?—I think that the question of prospective utility harks largely in the minds of District Officers when they submit their schemes. I do not say that the programmes are perfect. Much depends upon the personal equation. One officer thoroughly knows his district, and he has got good advice from his District Engineer, from planters and other persons well acquainted with the district. He will prepare a very good programme of works of great prospective utility. Another officer, who knows his district imperfectly and is not so well advised by the District Engineer, might send in a very *kachcha* programme. But the programmes are every year revised.

88. Q. Have you any reason to fear that a considerable number of programmes are *kachcha*?—No, I would not say that.

89. Q. Do you think the District Officer has time available to prepare a thoroughly well-considered programme?—I do not think so. I think the programme for each district is capable of improvement.

90. Q. Do you think that the District Engineer has time enough?—No, ordinarily he has not.

91. Q. Do you think he requires assistance?—I do.

92. Q. Do you think in some districts it might be advisable to make a careful survey of the country to discover its possibilities?—I think it is most desirable. I presume that the officer who makes it would not go into the district without any previous knowledge of the work and without carefully consulting local people.

93. Q. Would it not be preferable to have an officer permanently attached to the district?—The expense would be too great to have an officer permanently attached to the district.

94. Q. Why could he not be Assistant to the District Engineer and have other work as well?—I think it would be very desirable, if funds permitted.

95. Q. Now as to the proportion of the population for which work is provided, can you tell me on what basis it is fixed?—The number of people for whom work is provided is mainly estimated with reference to the previous famine history of the district.

96. Q. We will first take the district of Burdwan—I find you provided work for 21,000 persons for three months, with the average daily number employed was 11,000 odd? We now estimate 14,138 as the maximum number of persons likely to require relief on works, though we provide works for 21,517. The difference is not very great. Since 1873-74 I suppose there has been an increase of population in Burdwan. I take it that the Collector considered the population of the area which he returned as liable to famine, and estimated with some reference to the famine of 1873-74, that such and such percentage might be employed on works.

97. Q. On the other hand, we will take what might be estimated to be the worst district, Darbhanga. The highest number employed in 1873-74 was 569,000. In 1876-77 the highest number employed in one day was 149,000 and the average daily number over the whole period was 82,000. You provided for 176,000?—I should have to refer to reports before explaining the figures. I think the Darbhanga figures are now under enquiry.

98. Q. Is any rule laid down that estimates are to be made on the basis of what happened in 1896-97 and 1873-74; if so, can we see the rule?—On page 3 of our Famine Code it is laid down that estimates shall be made (a) with reference to the experience of previous famines, (b) with reference to the general condition of the various sections of the population.

99. Q. The rules seem to be different in different provinces?—In Bengal we estimate for each district with reference to the previous experience of the district.

100. Q. (Mr. Rajaratna Mudaliar.)—You said in reply to Mr. Muir-Mackenzie's question that there is no legal objection to the levy of a water rate or cess during the currency of a settlement, when the irrigation is supplied at the cost of the Government?—For levy of an occupier's rate for water our law provides. For levy of a cess it does not provide. To enhancement of rent on account of an improvement made by the landlord there is no legal objection.

101. Q. Supposing an irrigation work is made during the currency of a settlement, can you raise rent by transferring land from a lower to a higher class. You are speaking of rent, not revenue?—Revenue is fixed for a period. Government could not intervene so as to take a higher revenue from a zamindar during the period of settlement.

102. Q. I do not mean a zamindar; I am speaking of a tenant of a Government estate?—There is no legal objection to the enhancement of rent where a new work of irrigation is constructed by Government during the currency of a settlement.

103. Q. If an existing work be improved substantially, could you enhance rent during the period of a settlement?—Legally you could; in practice I doubt if this is ever done on a Government estate.

104. Q. Don't you issue a notification at the time of the settlement and is no provision made for enhancement in such a case?—You are speaking of improvements to be made between settlement and settlement. There is no practice of making a notification of that kind.

105. Q. (Mr. Muir-Mackenzie.)—But you do notify that rents will be fixed for such a period?—Yes, that would be recorded in the settlement proceedings. Government fixes the term of settlement and it will be well known to the rayats of a Government estate.

106. Q. It is not specially notified?—It is well known; but I cannot remember that there is provision for

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special notification of a period of settlement unless in the Sonthal Parganas. Ordinarily in the case of any big settlement the results are reviewed in a Resolution which is published in the Gazette, and in this way the period of settlement might be said to be notified. We have no provision of law unless in the Sonthal Parganas obliging such notification to be made.

107. Q. (Mr. Rajaratna Mudaliar.)—In Madras there is a provision by which, when the water-supply for irrigation purposes is improved or a new work is constructed, the assessment may be raised?—We have no such provision in our settlement code; but I have stated that the Bengal Tenancy Act would allow enhancement of rent between settlement and settlement in case of an improvement duly registered.

108. Q. As regards security for loans, you said that there was no difficulty in areas where a record-of-rights has been prepared?—I say that the procedure is very much simplified as regards security. Where there is a record-of-rights enquiries as to security are very much simplified. I mean it is easier to ascertain whether a man has a holding or not, and whether the holding is recorded in his name only and what are the area and rental.

109. Q. Whether he is an occupancy tenant or not?—Yes.

110. Q. If he is found to be an occupancy tenant, he is safe?—Nearly all our tenants are occupancy tenants.

111. Q. Then what is the difficulty in the case of a district where there is no record-of-rights prepared?—The difficulty is that there is nothing to identify the holding of an applicant for an advance. There is nothing but the rayat's statement as to what land he has.

112. Q. Does not the proprietor keep accounts? The proprietor keeps his *jamabandi* or rent-roll; but it would be without survey numbers of fields; it might or might not be correct; it might contain an obsolete name. It may not contain the present rayat's name.

113. Q. Do you obtain a certificate of encumbrance, as we call it, from the Registration Office?—I do not know the term.

114. Q. Where the land is mortgaged to others do you go to the registering office and make enquiries?—We might do so in the case of a zamindar taking a loan for a large amount. We would not ordinarily think of doing so in the case of a tenant.

115. Q. (Mr. Allen.)—As regards the Saran canals, it was urged before this Commission, particularly by Colonel Hodding, that the effect of the embankment was that it kept water out of the streams which, previous to its construction, would have come into the streams; therefore the maintenance of those channels would be more or less connected with the embankment. In other words, the cost of keeping the embankment up ought to include the cost of maintenance of the canals. He used that argument as justifying the levy of a water cess. Do you think this a strong argument?—The embankment prevents water from coming in and flooding the district whereby the district gains; but it keeps water out of the channels and thereby the district suffers; therefore Mr. Hodding's argument would be, I suppose, that it would be right to impose a future cess or an increased cess in order to bring in as much water as would be useful. This is an ingenious argument which I have not sufficiently considered.

116. Q. This is urged as a reason for including the canalisation as a part of the embankment scheme?—Yes, now I remember one of the engineers did suggest that the work of keeping the canals open might be connected with the embankment scheme, and that an addition might be made to the cess on this account. There are no doubt complicated questions connected with the embankment with regard to sluices and drainage. But I should not, without full examination, be prepared to accept this argument of Colonel Hodding's that because the embankment prevents the water coming in and flooding the district and keeps water out of the channel, it would therefore be right to impose an additional cess in order to keep the channels open. I have myself advocated more sluices in the embankment to let in water and to let it out. I would refer to a note which I wrote on the embankment two to three years ago.

117. Q. (Mr. Muir-Mackenzie.)—But you do not think that an additional cess should be made to provide sluices?—The sluices which have been proposed, so far as I am aware, would not have any great effect in filling these four canalised rivers.

118. Q. (The President.)—The argument is that you are merely restoring the *status quo*, and that the people had a right to have this water given back and that you are bound to do more in the way of canalisation to restore this benefit to the people?—I think that it might be examined. I should not like to express any opinion on this question straight away.

119. Q. From what we have heard probably the country had been enormously improved by the embankment. Probably it used to be devastated by the floods?—There is no question, I think, that the Saran District is benefited by the embankment. It may have lost the benefit of silt; but in this district agriculture has undoubtedly benefited by the protection of this particular embankment. I would not hastily express an opinion about embankments in other districts; but with regard to the Gandak embankment in Saran, I do not think there are two opinions as to the great benefit which the district has derived from it.

120. Q. (Mr. Allen.)—Do you think it advisable that tenants should be given further protection in Chota Nagpur with regard to improvements than at present?—I do. Rayats have absolute protection in Bengal in theory—at least in the Bengal Tenancy Act where that Act is in force. We have given them complete protection also in the Southal Parganas and they should have such protection in Chota Nagpur.

121. Q. With regard to the Chota Nagpur Encumbered Estates Act, there is a section. I think it is clause 4, section 4, which gives a Deputy Commissioner and the District Officer authority to spend money on the estate. The Commissioner suggested that considerably more money might be spent under that section on the maintenance of *ahars* and other irrigation works for the improvement of the estate. Do you agree in that opinion?—That requires a great deal of thinking about. The scheme of management of the encumbered estates in Chota Nagpur is drawn up principally in the interests of the zamindar whose estates are taken over and in the interests of his creditors. Anything that would prolong the management of the estate and would increase the period in which the debts are to be re-paid, may be argued to be unfair to the creditor. The law already provides for the cost of reasonable improvement of the property included in the scheme.

122. Q. (Mr. Muir-Mackenzie.)—Not only that it gives priority to improvements of the land?—Yes, I would be in favour of a very liberal interpretation of the duties of a District Officer with regard to works of agricultural improvement which would clearly benefit the estate and the tenants.

123. Q. (Sir Thomas Higham.)—With regard to the programme of relief works, are these prepared in your department?—They are prepared by District Officers who rely on the District Engineers for the small village works and on the Executive Engineers and Superintending Engineers for the larger works.

124. Q. They are examined in your office?—They first go to the Commissioner who examines them and who may consult the Superintending Engineer; then they come to Government in the Revenue Department. The Revenue Department not infrequently consults Government in the Public Works Department about the programmes. Every work which is to employ more than a thousand persons for three months requires to be sanctioned. Small village works are entered by the District Officer in the programme without the special sanction of higher authority. Larger works have to receive special sanction.

125. Q. Then small works are not scrutinised?—I would not say that. They are scrutinised in this way that the Commissioner and the Secretary in the department would go through the programme, perhaps especially to see that every thana or police circle had works provided.

126. Q. They would scrutinise as to distribution?—As to distribution, yes, and there is further scrutiny. Only yesterday I had a programme from a district in Orissa. The District Officer proposed to spend money on raising two roads. The matter was referred to the Public Works Officers and they objected. They said that the raising of these roads would prevent floods from the Subarekha river passing over the country. The proposal was vetoed on that account. I would not say that the programmes are thoroughly scrutinised. More scrutiny is desirable.

127. Q. Then as to the statement with regard to the maximum number requiring relief in the event of famine. How is the maximum number got at?—On the basis of the figures with regard to the number of persons who were relieved in the famine of 1873-74

or 1896-97. Our famine code lays down that the experience of previous famines is to be the guide.

128. Q. Who scrutinises them?—Who determines what maximum number of persons is to be entered as requiring relief?—We have no general rule of percentage. We do not say 5 or 10 or 20 per cent. We depend upon previous experience and the judgment of the District Officer and Commissioner. There is often much discussion of the figure. I can remember as District Officer making an estimate which my Commissioner would not accept. I took the figures of 1873-74, and my Commissioner who knew the District better than I did and who had served in it in the famine of 1873-74, said that the figures of 1873-74 would not do: that relief work had not been properly administered in 1873-74; and he cut down my estimates, I have no doubt, rightly.

129. Q. Would you enter the maximum for whom relief would be provided for three months?—Yes.

130. Q. But famine would be expected to last for more than three months?—Certainly. The punch would begin in about December and the maximum number would be employed in May.

131. Q. The maximum for three months would be equal to the average for five or six months?—Yes, it would be so.

132. Q. But you have provided a great deal more in some districts?—Yes. District Officers have sometimes prepared full programmes providing for more works than would probably be required.

133. Q. (The President.)—These three months' programmes to some extent mean something to go on with while you prepare some more schemes?—Yes.

134. Q. (Mr. Muir-Mackenzie.)—The preparation of new projects for famine is very unsatisfactory? Our code says that we should provide one work for every 16 square miles.

135. Q. One work for how many days or months?—That is not laid down.

136. Q. Looking at this table it appears that the greater proportion of the works are small works?—Yes, small works. The recent Famine Commissions have greatly encouraged small works.

137. Q. (Sir Thomas Higham.)—Have you a detailed programme for these small works?—Yes; every year there comes up a list of tanks and roads. I can give the programme to you in print for every district.

138. Q. Up to when?—Up to this year, 1902-03. Every year new programmes are sent up—sometimes revised, sometimes with little or no revision of last year's programme.

139. Q. Do you know what these villages works consist of?—Chiefly roads; but we encourage tank digging—excavation or re-excavation. Our Code says that tanks are more suitable as relief works than roads, because control of labourers is easier on tanks than on roads. We encourage tanks not only because we can collect the workers better, but as works of permanent utility.

140. Q. By tanks you mean deep holes in the ground dug wherever you find it necessary to employ the labour, and generally all that can be said for them is that they are good for collective labour?—Yes, and for drinking water for men and cattle. They are not largely used for irrigation.

141. Q. They are the sort of work that was going on in 1896-97 in Bihar?—Yes.

142. Q. In almost all the districts we have been to they tell us that they do not include the re-excavation of *ahars* that have silted up; and as it is a rather expensive business, zamindars will not do it and the rayats will not do it and Government will not do it. Is it not contemplated that works of that sort should be done by relief labour?—Yes, as far as I know, not much has been done in repairing *ahars* as Government relief works. Zamindars, as a matter of fact, ordinarily repair *ahars* and sometimes take advances from Government for such work.

143. Q. During famine?—Yes.

144. Q. If Government relief works cannot be opened on these private *ahars*, you must rely on the zamindar taking advances?—Yes.

145. Q. But is there no reason why in a time of famine, when it is very difficult to find useful work, *ahars* should not be made instead of making mere holes in the ground?

The President.—It is giving a present to the zamindar.

Mr. Macpherson.—It is doing his work for him. I should prefer to do the repairing of the *ahars* to mak-

ing holes in the ground, as you put the case of the drinking water tanks. I am not aware that the matter has been thrashed out in Bengal as to the expediency of giving help to the agriculture of the country in this way by repairing of the *ahars* and by employing relief workers on agricultural works of this kind.

146. Q. Of course one difficulty is that you cannot supervise it properly. Supervision would be more difficult for work of that sort than tank digging. You could not trust to zamindars to employ and pay labour. To disburse this money?—I think that these difficulties might be got over.

147. Q. I think that some of these tank works are on Government land. You do not re-excavate tanks on a zamindar's land?—I think we have re-excavated many tanks on zamindar's land. It has been claimed by District Officers in Bihar that when a tank is excavated by famine labour, certain public rights must in future be asserted. It is very common to re-excavate zamindars' tanks.

148. Q. You do not often clear out *ahars*?—I should say it is not common to clear out *ahars* as Government relief works.

149. Q. (Mr. Muir-Mackenzie.)—I should like to know whether you advocate the preparation of records-of-rights in water on the same lines as the records-of-rights that you have prepared with regard to rights in land?—The question was considered in Gya about seven years ago and may have attracted attention later. The Collector, Mr. D. J. Macpherson, strongly recommended, if I remember right, that there should be a record-of-rights in *pains*, i.e., of the Paharas, or rights of different villages or different landlords to respective periods of days or hours for enjoyment of the water. That was in connection with the survey of the Tikari estate in Gya. I think that we hesitated to make this record as involving decision of a large number of disputes. I am not sure how far the decision of the Revenue Officer with regard to water-rights would be binding in the Civil Courts.

150. Q. That is what was thought, but what is your opinion? Mr. Oldham and Mr. Ogilvy strongly support this view?—They have had great experience.

151. Q. (Mr. Allen.)—There is a clause in the notification about the Maksudpur settlement with regard to record of customary rights of irrigation, especially with regard to the duties of landlords about irrigation works?—It would be useful no doubt to have a record-of-rights in water or even a note on the subject in the village record-of-rights. If a binding decision is to be given, however, I take it that it must be given by a Civil Court. I speak without recent examination of the law on this point. Then it is asked whether it is desirable that Revenue Officers should decide such questions. Ordinarily when a record-of-rights is being made, the work in the Revenue Officer's hands is so gigantic that we are anxious to limit it to essentials. In a tract of a district containing half a million fields the Revenue Officer may find that in 50,000 fields there are disputes with regard to proprietary right or tenant right or some other question. We have hesitated to add to the record details with regard to rights in trees, details with regard to tanks, etc., and have kept the Revenue Officer to essentials concerning the land. But I am certainly of opinion that a Revenue Officer is more competent to decide the question of existing rights in water than a Civil Court.

152. Q. Do you think that the obstacles and expense and difficulties in making a record-of-rights in water are so great as to make it impracticable to carry it out?—No, I do not think they are too great. It is a matter of officers.

153. Q. And time?—And time.

154. Q. And if it was carried out, do you think that it would be distinctly beneficial?—I think it would be distinctly beneficial.

155. Q. There is one other point connected to a certain extent with the same thing. Mr. Oldham strongly recommends that the Collector should have power to compel persons in most instances to keep *pains* in repair and even *ahars* he said. The machinery that he proposed was that the Collector on receiving a complaint that they were out of repairs should give notice to the zamindar, and if he did not repair within a reasonable time, the Collector should repair and charge the cost to the zamindar. Would you be prepared to advocate anything of that kind?—The zamindars would be allowed, I suppose, to show cause why the *ahars* should not be maintained or why the *pains* should be allowed to go out of repair.

156. Q. We may take it that the *ahar* is in such a state of disrepair as to make it necessary; and Mr.

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Mr. W. C. Oldham said in Gya that such neglect is common?—
 Mr. Oldham knows his district very well and he has
 no doubt thought a great deal about this subject.
 I cannot speak from great personal knowledge of it.
 I have heard that in Palamau two *ahars* are in a
 state of disrepair.

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157. Q. Are there any grounds why such a power should not be given to the Collector?—The question arises whether it is often necessary for the Collector to interfere. If the zamindar does not repair his *pains* there is no crop. He gets his rent in kind, and the question is whether any penalty in addition to this loss of crop should be inflicted by the law. About 75 per cent. of the Gya District is leased on *bhau* or produce rents. It is a new idea to me that a penalty should be inflicted on landlords who neglect their duties in this matter; but I do not say that it would be wrong to give District Officers power to do necessary works which the landlord neglects. I hesi-

tate to give an opinion, but would say that the zamindars should always be allowed to show cause to the Collector as to why he does not repair the pain or *ahar*.

158. Q. Mr. Oldham represents that there are very serious disputes now going on with regard to the making of *pains*; these disputes sometimes lead to riots and bloodshed, and the Collector has to make an order if there is going to be a breach of the peace. He says I should be allowed to interfere before and to give an order as to how the stream is to be regulated. Would you be prepared to support that? I do not want to urge you to express an opinion?—Yes, I think it is better that the Collector should settle that than the Civil Courts. I should agree with the Collector. He would hear both sides and would sometimes want skilled advice, I should prefer his decision to the Munsiff's. It would save a great deal of litigation and expense.

WITNESS No. 70.—Mr. H. C. WILLIAMS, Commissioner, Bhagalpur.

Mr. H. C. Williams. 1. Q. (The President.)—You are Commissioner of Bhagalpur?—Yes I have been there 3½ years.

2. Q. I understand you also know most of the other districts of Bengal?—I have only been Collector of Burdwan and Darbhanga. I have been Commissioner in various divisions for a short time. I have seen a great deal of some of them. I was in Darbhanga during the famine of 1874. That was the only real famine experience I have had.

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3. Q. You have heard the evidence to-day. I would like to ask first what you consider practically the part of Bengal that should be considered with reference to protection from famine?—Bihar.

4. Q. The whole of Bihar?—Yes, the whole of Bihar, including both Divisions. Generally I do not know much of Patna except Darbhanga. I do not know much of Patna except tracts I also include Bhagalpur, Monghyr, and a little of the Sonthal Parganas; possibly a small piece. I consider Malda less likely to have famine than any district I know of.

5. Q. You would exclude the districts near Hooghly?—I should certainly think that there never could be any famine in these parts. The 1874 famine, as far as I can remember, was never serious down here.

6. Q. There is none the less a very considerable proportion of irrigation?—Yes.

7. Q. I am referring to the Eden Canal?—Yes. I was in Burdwan, and I had a little to do with it.

8. Q. The position of our Commission is this that where there is need for protection against famine or would give much latitude to the financial side. If there is no fear of famine, it must stand on its own ground financially?—Yes, that is quite right.

9. Q. Now taking the district of Darbhanga which you know well?—It is some years since I was there.

10. Q. A good many projects came up before us connected with rivers rising in Nepal?—Darbhanga rivers affect us only in North Bhagalpur and somewhat slightly in Monghyr.

11. Q. The difficulty was very strongly put before us that in times of drought Nepal turns off the cock and no water comes down?—Yes, I have heard that.

12. Q. But there is the river Kamla which, it was explained to us, was too large to be turned off?—Yes.

13. Q. Would you, putting aside large irrigation works, such as in Shahabad, for instance, recommend any course for Government to take on similar works, such as *bunds*, *pains*, etc., and more or less village works so as to immune them to stand famine?—It seems to me to be *a priori* a very difficult question to interfere with. You have got to start with this difficulty that there is no law making it obligatory for the zamindar to keep them up. It appears to me the zamindar might say, "I do not want it; my land is watered; other people want it and they should pay." If anything can be devised, I think in certain places it would be of very great use, but I am not prepared to say at present how you can devise a suitable scheme.

14. Q. I would like to know whether you think it would be justifiable in Imperial interests, where Imperial funds are spent on relief works, to spend money upon such minor works. The expenditure that Government is put to in times of famine is quite appalling?—Quite so, but take any district of Bha-

galpur, I do not think there would be any justification for making the zamindars pay. At present I do not think if you take up each district in turn that there would be sufficient to justify such a course. If you take North Bhagalpur, you would not be justified in saying that any zamindar should pay for the canal from the Kosi. That of course was a big scheme. If you take South Bhagalpur, I do not think there would be sufficient grounds for Government making the zamindars keep up their works or make new ones.

15. Q. It is the difficulty we have had to go into in one province after another, especially in the districts of Madras where an enormous outlay had been made upon tank irrigation schemes and where there was an old form of compulsory labour which has gone out of use, and there is no other way of doing it except to make them over to the Public Works Department to look after. There is no one else to look after it?—This is one reason why I imagine you find so many old tanks which have gone out of use. I mean the regular tanks in parts of Bengal. There is no doubt that in those days when they were made the Government were not powerful enough, or did not interfere, and they got their work done at much cheaper rates. In some places we have ourselves done it; in the same way, for instance, as roads are made in certain parts of India even now.

16. Q. In Monghyr is there a system of *ahars* and *pains*?—In Monghyr there is one excellent private irrigation scheme with which I have been very much impressed, and I think that the Government might take steps to embody such a scheme in other works. The scheme I am referring to is known as the Kharaspu irrigation scheme. There was made in 1875-76 by Colonel Money when he was manager of Darbhanga, and this has been and is at present of the utmost advantage both to the Darbhanga rayats and to the rayats of the Banelli *haj* who are very big landlords there.

17. Q. What is it exactly?—It started by a *bund* being made like you generally see in the Central Provinces. We have carried on the same principle to a certain extent in parts of the Sonthal Parganas on a smaller scale. (Here witness pointed out where the works were situated on a map.)

18. Q. Is the reservoir a large one?—It is a huge reservoir; I do not know the size of it. Last year the water was rather low in it, but whenever I have seen it (and I have seen it four or five times) it has always been pretty full. Last year when the crops were in an exceedingly bad state in that part of the country, Monghyr and Bhagalpur principally, the people said they were in for a serious famine, but all the villages affected by this magnificent scheme were very much benefited by it.

19. Q. Can you roughly say what area is covered by it?—I am afraid I cannot say. It is a scheme which I do not think is sufficiently well known in Bengal, and it is a scheme which might be valued much more. The only thing is that I do not think it is kept in such good repair as it might be. I am sure that the advantages of it have been wonderful. It was done by the Court of Wards.

20. Q. (Mr. Muir-Mackenzie.)—You know probably of other places where similar schemes can be put in operation?—There are a great many places where it might be. There are places in the Maharaja of Gidhour's property in South Monghyr where there are smaller hills, and I think it might be done in more places in the Sonthal Parganas. This is certainly the best scheme of private irrigation I have seen here. Of course it is an expensive scheme. We have private

irrigation over the immense area of 167,454 acres. It is divided into four different sections. Kharakpur just comes into the famine area. This tract marked "C" is included in the country irrigated by it.

21. Q. (The President).—This is on the north of the Ganges?—No, on the south of the Ganges. It joins to the south of Bhagulpur District which we have heard a great deal about.

22. Q. You don't know anything about Bankura?—Yes, I have been there.

23. Q. There are other suitable sites for reservoirs do you think?—Yes, I am quite sure there are.

24. Q. Such schemes are worth taking up by Government?—I certainly believe that they should be. I do not know what the cost would be, but irrespective of cost I think they are worth taking up.

25. Q. Assuming that there are similar places they should be very valuable for famine relief works?—They would not be of much use as actual famine relief works. The relief would be primarily in putting up the lands. This is not an expensive part of it. The expense is in connection with the sluices, drainages, etc.

26. Q. A bund is a very expensive business?—Yes, but that of course you can do. I should not be surprised if there were already schemes of that sort.

27. Q. Did you ever see any schemes for tank irrigation in these parts? Do you know those big pains in tract B?—Tract B is down in Gya. It is right between Gya and the Patna Districts.

28. Q. Is it a very large area?—Yes.

29. Q. If it is towards Gya side, it has probably the same system?—It has generally pains.

30. Q. You said something about the accuracy of these figures?—I am inclined to think that they are more correct than the original figures for Monghyr. That is what my knowledge is from marching through the country. The only part I know is irrigated by pains.

31. Q. Mr. Jeffries says that works of this kind may be carried out?—Mr. Jeffries is one of our youngest Collectors. He has not been in Monghyr for more than or four months.

32. Q. Are there any number of rich zamindars in Bhagulpur fit to take up a thing like this?—There are a very large number of big zamindars in Bhagulpur, but like so many other places the zamindars are not so well off. Too many of them are very much encumbered.

33. Q. You heard the evidence about *takari* advances. Do you think that it would be the right thing for Collectors to urge upon these people to carry out works and make advances to assist them?—I think that Collectors should do all that they can, but as regards *takari* advances, the fact that they are available is quite widely known. Some questions were asked by one or two gentlemen as to the elasticity or otherwise of the rules. I think that the rules in ordinary years work very well. Of course the *amlas* who are distributing the money will have their doubts whether it is a year of famine or not, but it is quite right that one should make careful enquiries. With regard to the security required there are various reasons why a Collector should be given a much freer hand. Strictly speaking, the rules are that enquiries should be made; but, as a matter of fact, it is quite impossible if there is anything like a severe pinch for these enquiries to be made. They are sometimes given over to the Sub-Deputy Collector or Kanungo or somebody lower down, and the result is that when the money is not realized explanations have to be called for. I think, therefore, that in certain circumstances it ought to be recognised that these advances should be wiped off. They are sometimes not *takari* advances at all, for every Collector knows that in a time of scarcity these advances are absolutely made over to the applicant and the chances of recovery are small. They are taken for agricultural loans, and they are taken to keep men from starvation who will not go to the relief works. Such a man sells whatever he has got, and when he has got nothing else left, he will go and take a loan from Government and say "I will pay it back." I think it ought to be recognised that though it is taken as a loan which he may pay back, still if he cannot pay it back it should be recognised as a form of charity and should be wiped off.

34. Q. But it is open to you to sanction it?—Yes, it is open to me to sanction the wiping off, but the Collector should be able to recognise this. Instead the loan is kept on the register and in cases where there have been changes of officers the particulars about the loan, i.e., under what circumstances it was

given get lost sight of. When the matter comes up the Commission or the Board may decline to write it off. I think that in times of distress a little more elasticity should be given. I perfectly agree about joint security. In Darbhanga I did that a great deal some years ago.

35. Q. With reference to the possibility of making some works like those in Kharakpur I quite understand the difficulties in the way of compelling zamindars, but if a good scheme effecting several zamindars could be brought forward, would it not be possible? Some of them would be men who could afford to go in for it?—Your great difficulty about those irrigation schemes is want of combination amongst zamindars. They would not do it among themselves. They would fall out.

36. Q. If you could get over the money difficulty, would they not combine?—I do not think they would keep to the agreement even if they did at first combine.

37. Q. You would not encourage them by giving them financial assistance?—You might do it possibly, but your difficulty will come in in keeping up the work and afterwards in repairing it. I think that even if they did agree at the time that they would agree so far only if Government persisted, but about keeping it up Government will still have to continue to put some pressure upon them. Even take this Kharakpur scheme. It was made by Darbhanga. Banelli made objections, I believe. There is a great deal of bickering with Darbhanga, because they say that Darbhanga gets more water than they ought to.

38. Q. You say that Darbhanga has not kept it up all right?—Yes. It requires more looking after.

39. Q. They do not get anything from the other owners who benefit by it?—I think it is entirely kept up by Darbhanga. I do not think Banelli contributes towards it at all. I think Banelli gets a certain amount of water, because it has certain rights in the stream. I do not think anyone pays except Darbhanga. It is a very good thing. It is one of the finest things we have ever done.

40. Q. There are a number of owners and they would make difficulties?—Yes, I think so. They would fight about the distribution and they would fight about the repairs. The distribution would be a very great difficulty. They would all want it on the same day.

41. Q. They would not allow the Collector to interfere in case of difficulty?—I do not think they would object to the Collector interfering. Some of them would like it. There would be a division of opinion on the subject. The strongest man would probably object.

42. Q. The Collector has no *locus standi*?—Just so; he has not. The great difficulty about all these schemes is want of money, want of combination and want of knowledge about these schemes.

43. Q. (Mr. Muir-Mackenzie).—You know Bankura?—Yes I know Bankura. I remember one scheme there at a place called Sonanukhi near Bankura where the Bardwan Raj holds a great amount of land. Four or five years ago there was an old canal which runs for miles, and I know that there were complaints and difficulties about keeping the canal up. It was the usual thing. The zamindar said "it is not my business to do so."

44. Q. The gross crop area practically liable to famine was 512,000 acres and private irrigation works other than wells as much as 200,000 acres, or about half the sum. Do you think these are tolerably reliable figures?—I cannot say. I have seen Bankura and Bismumpur, and judging by the part I have seen I should say that it would be

45. Q. Bankura is another place where investigation might reveal good schemes?—Yes.

46. Q. The greater part of the irrigation in Bankura is done by pains?—I cannot say I know. You had a witness, yesterday who could have given a good deal of evidence on this subject. A great deal of his trouble comes from Bankura.

47. Q. As regards wells, do you know any part of the province where wells are suitable and where well digging is not extensive?—I cannot say. They have no objection to wells in Bhagulpur, but they do not care about them for irrigating purposes. The greater part of this is in this tract of which we were talking about just now which joined to the Gya District. Where the Maharaja of Sonbersa lives there are no wells.

48. Q. In such tracts do you think well-irrigation is capable of extension?—Probably. I will answer that in another way. There are certain parts in the

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Sonthal Parganas that they do it; but in the Godda Sub-division it is capable of being extended, and if it is wanted you could extend it.

49. Q. Also in parts of Monghyr?—Probably.

50. Q. Anywhere else?—Yes, I think a little more may be done with wells in South Bhagulpur in what is called the famine tract area of Ka'eria thana. I do not think you could do much more there.

51. Q. But you could if more liberal funds were provided?—Yes.

52. Q. The Opium Department gets wells made?—Yes, they do; but they do not do very much. They do use wells. Probably a great many of them over that area are for opium.

53. Q. With reference to the security that can be obtained from tenants if advances be made, can you tell me are the tenantry very much in debt?—Yes, I think they are generally supposed to be a great deal in debt. The registration of the right of transfer does not prevent indebtedness very much. In the Sonthal Parganas the rayat cannot transfer lands as a rule.

54. Q. Elsewhere the Tenancy Act does act as a preventive to the right of transfer?—They do transfer in certain places. The great thing is how far the custom is customary. A landlord does not generally object to the transfer. He does in some cases. He generally gets a fee for it.

55. Q. A great deal of the land is encumbered?—I really do not know. I think it is.

56. Q. Then the question of encumbrances has something to do with *takavi* advances?—Not very much, because you don't go to the registry office for tenants' advances. There are very few under the Land Improvement Act. Take Malda; there is nothing at all.

57. Q. Looking at the financial side of the question, the reason why money is not wanted is because District Officers cannot give those advances without the possibility of there being a certain amount of security?—Nobody will take advances from Government, as a rule, to begin with. They would rather go to the *mahajan*. If the tenant takes an advance from the Government, and then has occasion to go to the *mahajan*, the *mahajan* would turn round and say "you go to the Government as you did before." Of course a great drawback to *takavi* advances is the punctuality of payment.

58. Q. All these objections are very familiar to us; they have been advanced wherever we have been, but notwithstanding it has been found in certain places in spite of these objections that where there are energetic and enthusiastic officers they get rid of a great deal of money?—Do you want me to get rid of a great deal of money?—That is the sole question and a great deal depends upon it.

59. Q. Do you think it advisable that advances should be given?—I do not think it is advisable that you should give these advances in many cases, for I do not think it is advisable to encourage people to get into debt to the Government or any one else unless there is some sound reason for it.

60. Q. Is it not advisable to enlighten him as to the advantages of making improvements and to let him have money for it?—Yes.

61. Q. Would you not think it advisable that officers should devote more time to enquiries as to any desirable improvements and to informing people of the advantages which might be derived from such improvements?—I think the attention of the Sub-divisional Officers might be drawn to it and they might, while on their tours, make enquiries and report on them. I do not think they go out of their way to find out where such and such improvements are needed in the villages.

62. Q. You think it would be a good thing if they did?—I would call upon them to note while on their tours on what objects money might be spent. I think ordinarily it would be a good thing.

63. Q. On the whole, you are content with the amount at present allowed for *takavi*?—I am quite content with the amount allowed in ordinary times for *takavi*. I think, however, that at certain times more is required. I know the District Officers say they did not get all that they asked for. They ask for more than they want in the perfect knowledge that they won't get all that they ask for.

64. Q. I would like to know whether you think it would be a good thing to have a record-of-rights in water?—I have not had much to do with that matter. My knowledge of it is limited. I have not had much experience except in the Eden Canal. From the little I do know I am inclined to think it would be. I have a strong idea of tanks as relief works.

65. Q. What is your idea of them as works of utility?—They are of very little use as works of utility. They are very useful for labour for the time, but as to any future results which would be obtained they are of very little use. They are of very little use for irrigation. In some parts of Bengal proper they are, however, very useful.

66. Q. (Sir Thomas Higham.)—Why?—For irrigation purposes. A great many of these tanks are something more than mere holes-in-the-ground. I would apply the term holes-in-the-ground to the so-called tanks which you get by excavating for mud to build houses like the holes-in-the-ground tanks in Lower Bengal. Tanks, as a rule, are very good for relief works. Instead of giving charity it is admirable for making people work, though it is not of much good as a subsequent result.

67. Q. Admirable for the time being?—Yes, admirable for the time being. They have a great advantage over roads, for they are close to the villages affected and they will keep employed a lot of people in a small area and they can be more easily supervised.

68. Q. Does your programme of relief works include a great many of these tanks? Would you not prefer to see them replaced by some other kind of work?—Do you mean for relief works proper, or for results to be derived afterwards?

69. Q. I mean, taking all things into consideration, would you not like to have them replaced by some more useful work even though supervision and enforcement of discipline might be very difficult?—The first difficulty will be that there might be no useful work in the neighbouring places where your tanks are supposed to be. Supposing a place which is affected by famine has already made roads, what are you to do. You cannot send the people from there afar off for relief. You must find some work on the spot, and in such cases I do not know anything better than these tanks.

70. Q. Supposing in a direct way work is wanted, you have useful works such as the cleaning out of *ahars* or the making of *bunds* and you also have tanks, which would you prefer?—Then I would take up the *bunds*.

71. Q. In spite of difficulties of supervision?—But there will not be any difficulties.

72. Q. Would you decide in favour of a work of superior utility, or would you take one in which the difficulties of supervision would be less?—I think that in a place where a small *bund* is wanted and would be useful and where the villagers are hard up and want relief in the shape of work, in such a case it would be better to take up a small *bund*. I should not like to say that it is contemplated by the rules and regulations, but here is the point. You want so much work and you want so much money. You divide and make it over to the headman. Some people will take some extra money, but if there is a good man in charge, he will see that the people get some money. I have done small works which are not exactly in the famine code, and I think it is a very useful way of doing small things. The difficulty here would probably be that the expense incurred would be out of all proportion to the benefit which is derived by the village.

73. Q. (Mr. Rajaratna Mudaliar.)—You would like to empower the Deputy Collector to grant loans without a reference to the Collector?—No, the Deputy Collector makes the report, but you must hold one person responsible and he cannot be the officer in charge of the district. You do empower your Sub-divisional Officers to make a full report about it. In certain cases of urgency he will make advances in anticipation of sanction.

74. Q. Is there any danger of giving these officers power up to a certain limit?—No, the Collector might empower them to make payments, holding them responsible for the payments in cases where there is any hurry.

75. Q. But not as a general rule?—Not as a general rule, and I do not think there is any necessity for it.

76. Q. Will they not be induced to grant loans themselves?—Yes, I think they might do it.

77. Q. In Madras even Tahsildars have power to disburse up to a certain amount (Rs. 250) and Sub-divisional Officers up to Rs. 500? Probably you allow more money?—Under our present system each district gets 3 or 4 thousand, and Monghyr, which is the largest district, gets Rs. 15,000. Malda gets Rs. 1,000.

78. Q. In 10 years we allotted 85 lakhs of rupees?—I do not know what the figures actually are, but I have no doubt 50 or 60 thousand rupees a year covers my division which contains a population of 9 millions of people.

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79. Q. In regard to the schemes you refer to, you would give the District Boards power to undertake them?—I do not think so.

80. Q. I mean works like the Khrakpur one?—I do not think so. District Boards vary very much. Certain Boards take a great interest and a great many do not, and it would be very difficult for them to undertake this sort of work; very often probably there would not be a single member of the District Board who was not living a long way off.

81. Q. I do not know what you do here, but in Madras we can get District Boards to undertake these works?—I do not think it would be desirable to do so here.

82. Q. In Darbhanga and Muzaffarpur it was said that the District Board could manage the business very well?—Yes. Where you have a large number of planters that might be the case, but it would not do to apply that to Bengal proper. In the districts in my division, though there are a certain number of Europeans, there are certain tracts of the country where there is no residing member of the District Board and where there would be no one to look after them, so that it would practically go back to the Collector.

83. Q. You said that notwithstanding the protection offered by the Bengal Tenancy Act proprietors somehow manage to enhance rent in the case of improvements effected by tenants. Is that your experience?—No, I did not quite say that, though there are many instances of it, I know one case where rents were enhanced. It was a case in which the matter had been forgotten, and the bund in question fell into rack and ruin. I do not know whether they enhance rents in that way generally. It depends upon the landlord.

84. Q. Are you acquainted with the Sonthal Parganas?—Yes.

85. Q. There the landlord is prohibited from enhancing his rent for irrigation works carried out during the currency of the settlement. Does not that take away from him all incentive to carry out improvements?—I think, as a matter of fact, they carry out very few improvements. The landlords of the Sonthal Parganas are all hard up. This is one strong reason why there are so few improvements there.

86. Q. But they are, under the Settlement Rules, precluded from enhancing rent, although they carry out improvements, and even at the next settlement it is doubtful, according to the Settlement Officer's memorandum, whether they can get enhancement?—It is perfectly correct. You are probably thinking of a case which Government decided this way. It was a case in which I agreed with Mr. Macpherson. He had raised the rents of the land, because he said the owner laid on the rayat to show that the improvements were made by him. Certain improvements had been made since the previous settlement. It was not known who had made them. At any rate the rayat did not make them. The Government held that it was probably made by the previous rayat, and therefore the landlord was not to get the benefit of it. I think Mr. Macpherson, probably had that in his mind when writing what he wrote. I have not read his note.

87. Q. He also states that the proprietors have no right to the village waste?—This is the property of the community.

88. Q. And one can prevent the zamindar from assigning it to another applicant?—Yes, quite right; but if the proprietor gives up or leases out part of the waste to the *jamabundi* rayats, the zamindar gets half the profits up to the next settlement.

89. Q. (The President.)—Are the zamindars there Sonthals?—Very few, if any.

90. Q. What is the object of this 15 years' settlement? Does the enhancement go to the proprietor, or does any share of it go to the Government?—It goes to the proprietor; it would not go directly to the Government.

91. Q. (Mr. Allen.)—When the landlord has got an enhancement of rent on account of improvements there should be some one to see that he keeps up things?—It is lost sight of. Last year some of the rayats petitioned Government to take up a certain bund as relief work, but I believe it was a registered improvement and they are paying enhanced rent.

92. Q. They could go to the Civil Court and get a remission?—They would not do that against the zamindar.

ELEVENTH DAY.

Calcutta, 8th November 1902.

Witness No. 71.—Mr. M. FINUCANE, Commissioner of the Presidency Division.

1. Q. (Mr. Muir-Mackenzie.)—You are now Commissioner of the Presidency Division?—Yes.

2. Q. You have been Director of Land Records and you have also been Manager of the Darbhanga estate?—I was Settlement Officer in the Darbhanga Raj and also acted as Manager of the Darbhunga Raj.

3. Q. And you have acquaintance with Bihar?—Yes, as Director of Land Records and Agriculture and in supervising the survey and record-of-rights in Bihar at the beginning of the operations there. I had experience of Bihar also as Manager of the Darbhunga Raj, and during the famine operations of 1896-97 I went over North Bihar several times examining famine operations there.

4. Q. You have also been Revenue Secretary to the Government?—Yes, and Secretary to the Board of Revenue.

5. Q. I may add you have special knowledge of tenancy questions, having given great attention to it and written a book on the subject?—I do not know that writing a book implies great knowledge. At any rate I have given special attention to the subject.

6. Q. I will, first of all, ask you if you have any opinion to give on any of the larger schemes of irrigation suggested to us?—I have had no special experience of any of the larger schemes of irrigation. They never came officially before me for examination either as Revenue Secretary or in any other capacity. They are managed here by the Public Works Department. I may say that no large scheme

of irrigation has ever been officially considered for the Presidency Division. In Nuddia and Murshidabad there are about 1,400 square miles in which distress prevailed in 1896-97. The distress in Nuddia was not quite so bad as the northern parts of Bihar, but still it was very severe there. Dwarkanath Sircar, Rai Bahadur, who was for 20 years or more District Engineer of Nuddia, and who supervised famine relief operations there, tells me he has two schemes now to suggest. One is a canal from the Ganges from Laltakuri vid Barhampar and Nuddia down to a place that is 6 miles north of Krishnagar (showing the map). The other scheme is the canalization of the Bharub river. I need not go into details. Whether these schemes are feasible or not, I cannot say. I can offer no opinion on that point, but the Rai Bahadur is here, and if the Commission wish to examine him he will be able to explain these schemes.

7. Q. Do you consider Nuddia liable to severe famine?—Yes, part of it is.

8. Q. I see that in 1896-97 the numbers employed on works was only 11,000?—Nuddia suffered in 1873-74; again in 1896-97.

9. Q. What relief was given?—Relief works were started and gratuitous relief was given.

10. Q. To how many people?—The total number of persons who actually received relief on Nuddia relief works in 1896-97 was 3,712,663 units.*

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* Vide appendices to Resolution of Bengal Government on the famine of 1896-97, Statement IV.

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11. Q. That is not at all large compared with some districts?—It is as large as Saran for example, and is the number for part of the district; whereas the Saran figures are for the whole district. The percentage of the numbers that received relief in Nuddia on the entire population of the area affected was as large in Nuddia as in the worst parts of Bihar. I do not say these districts are so liable to a severe famine as the worst parts of Bihar, but they suffered from famine on every occasion that we have had famine.

12. Q. Is that the number of persons on works or the number of persons receiving relief?—It is the number of persons on relief works. The number of persons on gratuitous relief was very much higher. The highest number on relief works in Nuddia in 1896-97 at any one time was in round numbers 28,000 and on gratuitous relief 83,000.

13. Q. Do you know why the number of persons on gratuitous relief was very much higher than those employed?—One reason is that it had never been the custom for Mahomedan women in that part of the country to do out door work. We found that the women and children were getting emaciated at the start and refused to come on to relief works, and therefore we had to distribute gratuitous relief to them more freely, and with less severe tests than elsewhere; and, secondly, the Collector did not, I think, sufficiently insist upon people being driven to the works instead of giving them gratuitous relief. The number of persons on relief works was less than it might have been expected to be, and the number on gratuitous relief was much larger.

14. Q. We were told that Nuddia is likely to be as severely affected as Saran?—Yes, a particular part of it. Saran was not very severely affected, and in fact the distress in that part of Nuddia to which I refer was far and away more severe than it was in any part of Saran. I had been over the whole famine area in Bengal and Bihar several times during the famine of 1896-97 except Chota Nagpur and Phabun where alone the Famine Commission found fault with the insufficiency of the relief given in Bengal and can testify of my own knowledge that the distress in parts of Nuddia, and the failure of the crops there was far greater than in Saran, and that the people there were quite impoverished. The soil is a light sandy soil, and a bad system of land tenure known as the *utbandi* system prevails there.

15. Q. (The President).—Is there any possibility of developing minor irrigation works in Nuddia?—It is not the practice to irrigate from wells there, but it may be feasible to do something in that way.

16. Q. The matter will require a great deal of enquiry?—Yes, and the people would have to be trained to well irrigation. They know nothing about it at present in that part of the country.

17. Q. Can you tell us anything regarding minor irrigation such as *ahars*, *pains*, canalization of streams, etc.?—When I was Settlement Officer in Darbhanga, I surveyed and settled the rents of entire parganas and was engaged in that portion of the country near the Nepal frontier for several years. I found the people themselves made *bunds* across the hill streams that came through from the Nepal, and they irrigated their lands from the water diverted from these rivers. They first made ancient and took water by means of them from above these *bunds* and drew it on by smaller drains to their fields. When the *bund* was made higher up the stream and shut off the water lower down, the people from below came at night and sometimes by day, and cut the *bunds* (which were made of earth) with the result that rioting often ensued. It occurred to me at the time that it might be useful to make permanent weirs and sluice gates on these rivers, and I had the country examined by an engineer with a view to ascertain whether that could be done. He drew up plans and estimates, and the scheme was considered by the Court of Wards under which the Darbhanga estate was at the time. The Court of Wards said it was a most valuable scheme and ought to be carried out, but as the estate was soon to pass out of the hands of the Court of Wards, they preferred it to let it lie over until the Maharaja came of age. I left the Darbhanga Raj before anything was done. I understand that nothing has since been done in the matter. It is worthy of enquiry whether the water-supply from the hill streams coming down from Nepal cannot be utilized more than it has hitherto been utilised in areas which are not commanded either by existing canals, or that may not be commanded by proposed canals. The estimated cost was only half a lakh or one lakh, and the Raj *raiya*s were willing to assist with labour and the Maharaja would perhaps be also glad to contribute.

18. Q. Have you never been confronted with the objection that the river was banded up in Nepal, and that you would not get water at times?—Yes. The rivers are sometimes banded up in Nepal, but if that were always the case, there would be no use in *raiya*s making *bunds* lower down as they do: the people would not build these *bunds* if ordinarily the water is not allowed to come down. In a season of drought there might be that difficulty.

19. Q. What would be the use of permanent *bunds* if the water is shut off?—As a matter of fact, the water is not shut off in ordinary years. In years of great drought it is perhaps shut off, and in years of short rainfall in Nepal these *bunds* might possibly be of little use. Our *raiya*s very often went up and cut the *bunds* in Nepal.

20. Q. I suppose they (the Nepalese) have the right to make the *bunds*?—Yes.

21. Q. (Mr. Muir-Mackenzie).—At any rate there is this imperfection in the scheme that in a year of drought the water might be cut off?—Yes. The scheme is not a guarantee against famine, but it would be most useful at other times and it may be in famine times if the Nepal authorities can be persuaded to let surplus water come down. In 1897 complaints were made that the Nepal authorities stopped the importation of grain. We addressed the Government of India and asked them to bring influence to bear. I do not know what was done. At any rate the prohibition regarding importation of grain was withdrawn. The Government of India also addressed the Nepal Durbar about *bunds* and the Nepal authorities helped us. It may be possible to make arrangements with Nepal regarding *bunds* and to arrange that the Nepal authorities should have sluices of their own.

22. Q. You think that the Nepal Government is not likely to prove unreasonable in the matter?—I think it may be possible to make some arrangements with Nepal, but cannot say for certain. The Nepal Durbar helped us in 1896-97.

23. Q. It occurs to me that in self-defence Nepal would take all the water that it could?—Quite so, but Nepal may arrange to let water come down when not required for its own people.

24. Q. If you had had this scheme carried out, would they have taken the water every year? We have had some evidence of the fact that they would not want water in good years; perhaps not more than once in four or five years?—In that part of the country to which I refer in the north-east of the Darbhanga District, Alipur Pargana, which is a rice country, they want water every year: they make *bunds* every year: I cannot say this would apply to the whole of the country. It is almost impossible to enunciate any proposition that would apply to the whole of the country.

25. Q. You do not know anything about these little canalization schemes of Mr. King?—No, I have never seen them.

26. Q. With regard to the canalization of the Kamla, Mr. King said that though all the other streams may be banded up by Nepal, the Kamla would not be banded up. I cannot say whether your scheme is connected with the Kamla?—No; an account of my scheme was in my settlement report of Pargana Alipur. (Report Landed in.)

27. Q. In this country you consider there is considerable room for extension of minor irrigation?—My opinion is that the matter ought to be carefully enquired into by professional officers of the Public Works Department. I should not like to go so far as to say that there is a possibility of extending these *bunds* everywhere in North Bihar. I should think it would be best to have the country surveyed and the possibilities of extending *bunds* and other minor irrigation works inquired into by the Public Works Department.

28. Q. You would approve of an official being given to assist the District Board in carrying out works of this kind?—I think it would be better to give an officer to the Collector.

29. Q. How would you propose that a work of this kind should be paid for? Would you be in favour of the imposition of a cess as regards these minor works?—If the Government drew up a well-considered scheme and laid it before the landlords and tenants of the areas affected, and the people knew what the cost would be and the benefits derived, I should like to leave it to themselves to settle how the cost should be paid. In some cases tenants would be very glad to pay and in other cases landlords would be benefited and would agree to pay, and in some cases the Government

would possibly be benefited. Where land is brought under cultivation by irrigation which would remain uncultivated but for irrigation, the landlords would get rent for newly cultivated land which they otherwise would not receive at all and should be called upon to pay a large proportion of it, when the outlay incurred for bringing the land under cultivation was not made by themselves. As regards the land already under cultivation, the *raiyat* chiefly gets the benefit of irrigation because the landlord is not entitled to enhance rent for works of improvements which he has not himself paid for, but he gets some benefit in the shape of security for the regular payment of his rent. Therefore it would be impossible to say generally whether a cess should be imposed on one or the other, or both. In each case it would be very much a matter of arrangement. The general principle should be that those who benefit by irrigation should pay for it.

30. Q. You would tell them what the cost is and if they accept it let them pay?—Yes, but the imposition of a cess on landlords and tenants generally would, I think, be objectionable and difficult to work equitably.

31. Q. Is the machinery that is employed in the Embankment Act or the Drainage Act suitable for consulting people as to what they have to pay?—The District Boards have power under the Bengal Sanitary Drainage Act to undertake large or small schemes of drainage which are intended to improve the sanitation of the locality and a cess extending over 30 years is imposed, on the principle of the road cess, on landlords and tenants in order to pay the cost of such schemes. A large drainage and embankment scheme has recently been proposed in the 21-Parganas under the Bengal Sanitary Drainage Act and the landlords and tenants have agreed to pay for it by a cess extending over 30 years.

32. Q. And as regards irrigation works?—There is no objection in principle to District Boards carrying out a work of irrigation, but the difficulty is in devising a cess which would be just and fair and which a District Board can be reasonably expected to realise. There may be no difficulty in handing over the carrying out of these works, but there is difficulty in the cess itself. As regards money spent on sanitary drainage works, all the landlords, tenants and others of the area affected benefit by sanitary improvements brought about at their expense. They all benefit by the sanitation of a country. In the case of irrigation works that cannot be said. Some derive benefit; others do not. Some holdings benefit and some do not. Some fields in the same holding benefit and others do not. The District Boards have not got the agency by which they could distinguish in what portion of a given area a cess should be imposed and in what it should not. There may be cases in which the District Board with the consent of the people concerned could start a scheme and realise a cess. I would simply empower them to undertake such works, but I would not give them power without a full reference to, and approval by, Government to impose a cess for irrigation works. A cess must be apportioned fairly and equitably according to the benefits received for it, otherwise some individual interests may gain and others suffer.

33. Q. The consent of the people has to be taken under the Embankment and Drainage Act; how is it obtained?—Notices are issued and the majority of the landlords' opinion is given effect to.

34. Q. What notice? By beat of drum?—The consent of the people affected by an embankment or sluice has not to be obtained under the Embankment Act II, B. C. of 1882. The Government is empowered to act without their consent after their objections have been heard. Objections are invited by notices, proclamations and beat of drum. Under the Bengal Drainage Act the assent of the majority of the landholders is required before a drainage scheme can be undertaken, and their assent has to be given in writing. Under the Bengal Sanitary Drainage Act the District Boards or Municipalities affected have to apply for any sanitary, drainage or other scheme they may wish to carry out.

35. Q. The consent of the majority is sufficient?—Yes, where consent is required, i.e., under the Drainage Act and Sanitary Drainage Act.

36. Q. No attention is paid to the views of the minority?—They have to pay their share of the costs, but objections of the minority are received in writing and considered by Government before a scheme is sanctioned.

37. Q. In reference to the management of works by District Boards, I distinguish between other District Boards and those that we call strong Boards as in Bihar where a lot of European planters and big zamindars are on the Board?—I am afraid that Bihar is just the very place where I would insist upon a full report to the Government

as to the justification of the cess, and I would insist upon an approval of it by the Government before I allowed the District Boards to impose it.

38. Q. That is not my point. As regards the management of works, there would be a better chance of intelligent and careful management of such a Board as I referred to in Bihar than elsewhere?—Yes, but I would not allow a cess in Bihar to be imposed by the District Board for irrigation works without the knowledge and approval of Government. In the case of drainage, embankment and sanitation works from which landlords and tenants alike benefit, I think a cess on the principle of the road cess is justifiable, and that it affords the most convenient way of realising the cost of such works. Under the Drainage Act VI of 1880 the costs of drainage schemes are realised from proprietors and tenure-holders holding at fixed rates and they are left to sue their tenants for enhancement of rent on the ground of the improvement effected by the embankment or drainage work or to arrange for optional payment of the costs by the tenants (see sections 42 and 43 of the Act). I think this is not fair to the proprietors. The cost of such schemes should be realised from landlords and tenants by a cess on the principle of the road cess, and this would popularise such works. If it could be shown that any particular irrigation work would benefit all the landlords or tenants, or both, of a particular area, there would be no objection to the imposition of a cess on all the landlords or tenants, or both, over that area in proportion to the benefits received.

39. Q. Is your knowledge of Saran sufficient to enable you to give us an opinion as to whether you would allow a cess there?—I have read papers on the subject which came before me as Revenue Secretary. I should not like to offer a positive opinion without knowing more of the local conditions, but it struck me on going through the papers that the cess would not be justified.

40. Q. Why not?—If you consider the subject from the owners' point of view, there is the objection to it which I have already mentioned that they cannot get enhancement of rent on the ground of irrigation works which have not been constructed at their expense and therefore a cess cannot be justly imposed on them. If the cess is meant for the tenants, they can at present take water and pay for it if they wish, and if they do not wish to take it, it is difficult to justify forcing them to take it. I am not, however, prepared to say positively that the local conditions may not be such as to justify a cess.

41. Q. I would like to know whether you consider that any additional stimulus could be offered with advantage to landlords or tenants to improve their means of irrigation by securing to them a return for their outlay?—Under the law, as it stands in Bengal, every inducement which is possible by law to hold out for encouragement of improvements by landlords and tenants is afforded by the Bengal Tenancy Act. A landlord can, under the existing law, if he proposes to carry out an improvement, take an agreement from the tenants beforehand for payment of enhanced rents. There is absolutely no restriction as to the amount of enhanced rent that a landlord can take by contract from his tenants on the ground of improvements executed at his expense. If the tenants will not agree by contract to pay enhanced rent in consequence of a landlord's contemplated improvement, he can under the law still make it and sue for enhancement of rent and get his enhancement, so that as far as the landlord is concerned the law does all that it can do in the way of encouraging him to make improvements. Now, as regards the tenants, the majority of them, both in Bihar and Bengal, some 90 per cent., I think, are occupancy tenants. They have occupancy rights. If an occupancy *raiyat* digs a well or makes a tank or carries out any other improvement, at his own expense, he is entitled under the law to have the benefit of that improvement to himself and to his successors for ever. The landlord cannot enhance the rent on account of an improvement executed at the expense of the *raiyat*, and if by any means the *raiyat* should be ejected, he is entitled to compensation for the unexhausted value of improvements made by him. An occupancy *raiyat* is also entitled to make improvements without the consent of the landlord unless the landlord wishes to make it himself and *vice versa*. I do not see that the law can do anything more in securing to landlords and tenants the benefit of improvements made by them.

42. Q. Do landlords and tenants thoroughly understand their privileges under the law?—I think not; it may well be asked why it is when the law is so much in favour of improvements being carried out that no great improvements have been carried out since the Bengal Tenancy Act has been passed. The reasons are as regards the landlords in Bihar

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that there are a great many co-sharers in the same estate and they will not all agree and combine to carry out improvements. The *raiyats* do not understand the law. Even when they wish to make wells or tanks they sometimes have not the necessary capital, and again I am afraid that difficulties are placed in the way of the *raiyats* sinking wells or making tanks, or carrying out other improvements by landlords exacting *salams* and placing other difficulties in the way.

43. Q. Can you suggest any steps which could be taken to make *raiyats* better acquainted with their privileges under the law?—The record-of-rights which is being made in Bihar will, to some extent, enable the *raiyats* to understand their rights, especially with regard to the question of enhancement of rent which is the most important thing, because any man who gets a document as the *raiyats* all do where a record-of-rights is prepared, stating what his rent is, and what he is liable to pay, will probably refuse to pay any higher rent illegally demanded than that entered in that document. I think it would be possible to enable the people in the villages where record-of-rights are made to understand what these rights are in the matter of making and benefiting by works of improvement. I also think that, with reference to sinking of wells and making of tanks, much may be done in the way of facilities by giving of loans under the Land Improvement Act.

44. Q. You think that, with the object of enabling tenants to understand what their rights are, the preparation of the record-of-rights will constitute a considerable step in advance, and that where it has been framed they understand better than they did before?—I think that they certainly understand what their position is better than before. I am not aware of any special steps having been taken to make them better informed as to their rights regarding improvements, but that they understand their rights generally better where a record-of-rights is prepared admits of no doubt whatever. I proposed long ago that an abstract of the rights and liabilities of tenants should be given on the back of the *khakass* which they receive where a record-of-rights is being prepared. This would bring home to them a knowledge of their rights to make improvements, but the proposal was not accepted, because I believe it was feared that the abstract might mislead or unsettle the tenants. I still think this ought to be done.

45. Q. (Mr. Rajaratna Mudaliar.)—Mr. Milne and Ram Narain Singh both very strongly urged that the registration under section 33 of the Bengal Tenancy Act for improvement are very stringent, and that it is practically impossible for raimdars to establish a claim for enhanced rent?—This registration presents no difficulty in their way; the only necessity which exists under this Act is of having an improvement registered.

46. Q. That is the difficulty which we are told, prevents the enhancement of rent?—Here are the sections 33, 30 and 31. (Reads.) There is nothing to prevent a landlord from having his improvement registered. An application to register an improvement can be refused, after enquiry, only by the District Collector himself under the rules in Chapter III of the Tenancy Act Rules. The Collector is not likely to refuse registration or to place difficulty in the way where the improvement is a real one.

47. Q. (Mr. Muir-MacLenzie.)—Do you think that there may be any objection on the ground that the disrepair, which the so-called improvement set right, was due to previous neglect on the part of the landlord, and that the improvement was only a fulfilment of a neglected duty?—That difficulty may arise perhaps in Gya, but it does not arise throughout the country generally. And in places like Gya where a landlord is by custom bound to keep up these works, whether it would be an improvement to merely spend money on doing what he is bound to do and whether a *raiya* is bound to pay enhanced rent on that account, is a question of fact which might be tried in the Civil Court. I should not like to say positively. The difficulty does not arise throughout the country generally. The case of Gya is a special case. Moreover, even if a Collector were to refuse registration under section 31 of the Tenancy Act, landlords and tenants can have evidence recorded of any improvement alleged to have been made. The evidence must be recorded in accordance with the provisions of sections 182 and 181 of the Civil Procedure Code; the record is admissible in evidence in any suit or procedure between the landlord and tenant (section 81 of the Act and rule 7 of Chapter III of the Tenancy Act).

48. Q. Are improvements registered by landlords?—Not generally, because they do not very often make them. They are very often ignorant and go on according to the custom of the country. But many improvements have been registered and the number of registration is increasing.

49. Q. You would not like to see the Collector given the power of enhancing the rent instead of the Civil Court?—Not generally. Revenue Court formerly tried all rent suits and the system was deliberately abandoned.

50. Q. The zamindar would prefer it?—The Collector might perhaps give a larger enhancement than the Civil Courts, and proprietors would naturally like facilities for enhancement; but yet when the Bengal Tenancy Act was being amended in 1878, the British Indian Association representing the zamindars preferred that enhancements of rent in the permanently settled areas should be left to the Civil Courts and not transferred to the Revenue Authorities.

51. Q. In determining the nature of the improvement, do not you think the Revenue Officer with all his experience is likely to do it more satisfactorily?—The Collector now determines the nature of an improvement, i.e., whether any work is an improvement or not. I think there is a great deal to be said for the view that, in the case of enhancement on the ground of improvements, the Collector and Revenue Authorities are better qualified to judge what is an improvement and how far enhancement of rent is justifiable on that ground; but as to enhancement of rent generally on other grounds, I should prefer the Civil Court. It is to be observed that Collectors have, under the rules in Chapter III of the Tenancy Act Rules, to decide what is and what is not an improvement before they register it and to record evidence of improvements.

52. Q. In Bombay landlords get larger enhancements in Civil Court?—Here on whichever side you put the burden of proof, that side loses by going to the Civil Court. In the case of Revenue Authorities' proof is not so difficult. The Collector or Revenue Authority may go to the spot and ascertain the fact. I may mention an instance of how improvements are impeded by ignorance of *raiyats* and how sometimes difficulties are placed in the way by landlords. In the Darbhanga Raj when I was making the settlement there in 1876 there was scarcity and relief works were started, and the *raiyats* of some villages came to me and said that they wanted permission to make tanks and I gladly gave them permission to make these tanks as relief works; but I found that the custom had been before a *raiya* was allowed to dig a tank that he should execute a written agreement to pay Rs. 250 *salami*, and continue to pay the rent of the land and to be in no way entitled to the fish or other produce of the tank. I put a stop to this state of things, and the result was that in one pargana, in that year of distress, there were no less than 54 tanks made by head *raiyats* at their own expense, and the Darbhanga Raj had to pay nothing for these tanks. That illustrates to my mind that much can be done by encouraging *raiyats* to make tanks and wells for the improvement of their holdings by informing them of what their rights are, and by seeing that illegal obstacles are not placed in their way.

53. Q. You mention want of capital as one of the difficulties. Would not that be remedied by improving the system of taking advances?—Yes.

54. Q. At the present moment the amount of advances is very small?—Yes; I think that avoidable difficulties are placed in the way of people taking loans under the Land Improvement Act. In the matter of making budget provisions for loans the Collector has before August of the current year to make out an estimate of his requirements of the following year. It is difficult for Collectors to foresee what their requirements will be so far ahead, and, as a rule, they estimate for very little. Then if during the following year a *raiya* or zamindar comes to the Collector to take a loan, if he has not made budget provision, the result is that the landlord or *raiya* does not get the loan and goes off to the bania and gets it from him. But assuming that budget provision has been made, the applicant has to come under the existing rules three times to the Collector's office before he gets the money. An honest and industrious *raiya* hates going to the Collector's office far away from his village. He does not know the ways of the place and he is plundered by the *amlas* and the people round the Court and he is kept hanging about the Court for several days. All that naturally interferes with his inclination to take an advance. All this may perhaps be remedied by authorising Collectors to spend every year a certain sum of money which may be provided for in the budget of every district and by also authorising Collector and Sub-divisional Officers and other Revenue Officers to make enquiries themselves, and whenever they see that there is any work of improvement, whether a well or a tank, that is likely to be profitable, to tell the people concerned that they have money and are willing to advance it there and then on adequate security. If some such scheme were adopted, I think it is likely that the *raiyats* of Bengal may in time execute improvement on a very much greater scale than has ever been thought of.

55. Q. There is a precedent for this practice which is adopted in the Opium Department?—Yes, and the result is that the Opium Officers have advanced large sums for wells on land suitable for opium. I think their services should be employed for making advances for all other kinds of improvements and not alone for irrigation do opium lands. I understand that Opium Officers have very little to do for considerable periods of the year, and I would suggest that their services should be utilised in working out schemes for wells and tanks and in making these advances.

56. Q. Could not the Sub-divisional Officers do this?—Yes, so far as other duties permit, but one difficulty Collectors and Sub-divisional Officers have is this that, although they are all anxious to introduce improvements, they are hampered by want of establishments and by other works. I certainly think that it would be better to have special officers in every district if possible to examine the district and see what could be done in the way of encouragement of irrigation and other improvements.

57. Q. With regard to the budget provision, would you recommend that the Collector should have for so many years a certain fixed sum placed at his disposal from which he could make loans without any of the delays and the trouble that at present arises, and further that he should report every year to the Board of Revenue why it is that he has not been able to spend the money, and that he should be encouraged to spend that money on useful schemes?—Yes, if possible.

58. Q. You would have careful enquiries made as to the work on which he is going to spend money, and that he should, while on tour, make the necessary enquiries regarding security?—Yes, personally and by means of subordinates.

59. Q. Would it not also be necessary to have some agency to inspect the work to make sure that the money was properly appropriated?—Yes.

60. Q. He should give the money out by instalments and inspect the work each time before he gave more?—Yes.

61. Q. Do you think it desirable to have a record of rights in water?—I think that in areas like Gya and other parts where disputes arise about water or the custom regarding the distribution of water, it is very desirable indeed that the existing custom should be ascertained and recorded and where disputes arise that an agency should be provided for settling these disputes. When I was Revenue Secretary orders were, I think, given that the rights of villagers in the *pains* and in reservoirs of Gya with regard to the distribution of water should be recorded in the record of rights and that where disputes arose they should be settled by the Revenue Officers whose decisions of disputes have the force and effect of a Civil Court decree. When any dispute arises in making a survey and record of rights in permanently settled areas, the Revenue Officer is bound to decide the dispute and his decision has the force of a decree and that applies just as much to rights and customs regarding water as to any other conditions of the holding. Where there are no disputes or where a record of rights is not being prepared, I do not think it would be worth while to take up the question and make a record of rights in water.

62. Q. Where rights are complicated and lead to disputes you think these rights should be framed?—Yes, where a record of rights is being made, Revenue Officers should record the customs and rights of the people in water just in the same way as they record other rights and customs.

63. Q. In the Gya District it was suggested that we should give the Collector power to make landlords keep their *pains*, *bunds* and *ahars* in a state of repair. It was

proposed that he should give notice to the landlords to make repairs when the works were found in a bad state, and that if the landlords failed to do so, the Collectors should have the power to carry out the work and charge it to the landlord. It seems a strong measure?—As regards Bengal and Bihar generally, I do not consider that any such measure is required, but whether in places like Gya where people have to combine to make and maintain irrigation works, it would be desirable to give the Collector such powers is a question on which I should not like to offer an opinion without local enquiry and more knowledge of the facts than I possess.

64. Q. With regard to wells, do you think that in certain parts of the provinces there is room for considerable extension of well irrigation?—Yes.

65. Q. In all the places where the soil is suitable and water within a reasonable distance?—I consider that there is very great room for extension of well irrigation, especially in Bihar. In the Sitamarhi Sub-division of Muzaffarpur, when the scarcity of 1896-97 began, I found that the people there were digging *kachcha* wells and that they had water within 6 or 7 feet of the surface while the crops on the surface were dying of drought. The Bengal Government offered certain inducements to the *raiyats* to dig *kachcha* wells and they were then made on a large scale in that Sub-division only, but I consider that enough was not done in other parts of Bihar, and that this system might have been extended to other parts in that year as a more temporary measure. As I found in that year of great drought and famine in that large Sub-division, that there was water within 6 feet of surface, it seems to me that there must be room for the extension of wells in that part of the country. In Lower Bengal, on the other hand, I do not think much can be done in the way of making wells for irrigating rice, but in some parts of Nuddia tract, which I have mentioned as a famine tract, I should think from the nature of the soil that wells might be introduced there.

66. Q. You would not despair of training the people?—I would not despair of training the people to do anything that is to their own interests to do. If they were trained to make wells and having made them they found that the result was beneficial, I think that they would adopt well irrigation.

67. Q. Have you ever tried bringing cultivators from other parts of the country where well irrigation has been done?—I have not personally tried this, but I think it has been tried by the Agricultural Department.

68. Q. With any effect?—I cannot say. Mr. Allen will be able to tell you.

69. Q. (Mr. Rajaratna Mudaliar).—Would legislation be necessary to prepare a record of rights in water?—No.

70. Q. You think sections 101 and 102 of the Bengal Tenancy Act contemplate it?—Yes.

71. Q. They only relate to the incidents connected with land. There is nothing about rights in water. I do not think this section applies?—Yes; the section says the Revenue Officer is to record the incidents of every tenancy and any other particulars the Local Government may direct; I think the right to water for irrigation of a holding from wells, tanks or other sources, where it exists, is an important incident of the tenancy.

72. Q. Has that been accepted by the Legal Officers of the Government?—I do not think the difficulty has ever arisen. I have not heard the question ever raised. I don't think that the question has ever been raised in the Civil Courts or before Revenue Officers. It seems to me manifest that the customs and rights of tenants to water for irrigation or the non-existence of such rights, as the case may be, are important incidents and conditions of their tenancies.

Mr. H.
Finucane.
8 Nov. 02.

WITNESS NO. 72.—BABU DWARKANATH SIKKAR, District Engineer, Nuddia.

In reply to President's questions the witness explained his proposal for irrigating the Doab between the Bhagirathi and the Jalangi, two long rivers, by means of a canal about 80 miles taken out of the Ganges river. The tract that would be watered by this canal is badly in want of water since 1896, and in this part of the country water is very badly wanted—once every 8 years. Sometimes this tract suffers from too much water. To deal with the abnormal floods to which this part of the country was liable it would be necessary to have

masonry head-works. The canal would cost about 10 lakhs and the people would be willing to pay 8 annas per acre every year whether they took water or not. One of the difficulties in connection with the scheme would be in regard to the realizing of rents, because the tenants here have no occupancy rights. The witness also explained his proposal for the canalization of the Bhairab, a river flowing over a great part of its course on a bed higher than the adjoining land.

Babu
Dwarkanath
Sikkar.
8 Nov. 02.

WITNESS No. 73.—MR. D. SUNDER, Commissioner of Sunderbands.

Mr. D.
Sunder.
8 Nov. 03.

1. Q. (*The President*).—What post have you held hitherto?—I was for 5 years manager of the Government estate in the Western Duars and also for 5 years Settlement Officer in the Western Duars and for 3 years Settlement Officer in Palamau and 3 years Sub-divisional Officer in Bihar in the Bihar sub-division of the Patna District.

2. Q. Does the irrigation of the Sone Canal come into your sub-division?—No.

3. Q. You were principally in the Western Duars?—For 10 years, i.e., 5 years I was Sub-divisional Officer and Manager and 5 years I was Settlement Officer.

4. Q. It is a country which never suffers from drought?—It has suffered at times.

5. Q. Has there ever been any famine there?—There was distress about 10 years or more ago.

6. Q. Do you know anything of the irrigation projects proposed in Palamau?—I proposed a scheme called the Madanra scheme which I mentioned in my Final Report on the Palamau Government Estates Settlement. Along with that I recommended another scheme for damming the Hargurwa river which is on the south of Tappa Kote. There was another scheme that I thought of. There are numerous streams coming south from the hills, and if some of them be dammed up, huge tanks and reservoirs will be formed. (Witness here explained his scheme with the help of map.)

7. Q. Did you find any other sites that you considered would be suitable for making reservoirs?—There are numerous sites in Barissa Tappa Bareysand and other southern tappas.

8. Q. Were they ever surveyed?—They were never surveyed. There was some talk about it.

9. Q. You judged from an eye-survey?—Yes. It is easy to see that it could be done. There are three streams which fall into the Amanat. If a dam be put across here, the water would flow into the numerous *khajana* or *ahars* and fill them up, and the water would then be available for distribution over very large areas, some 4 miles square.

10. Q. Do you think that people in Palamau would take the water every year?—They would use the water certainly.

11. Q. Are there not a number of *pains* over the fields?—No.

12. Q. Tell us about this Nadanra scheme?—Witness handed some photographs and a map to the President and replying said:—There are three streams which come from here. They all meet at this point. If there was a masonry dam put up here, it would lead the water into several *ahars*, and a good portion of the land here would be irrigated. This is the Amanat river. Instead of the water falling into the river it would be distributed here.

13. Q. Have you any idea of the number of feet of water there is in it?—It all depends upon the rainfall.

14. Q. Would the people in the south complain about it?—It could not touch them, as the Amanat is fed by many hundred streams. It would not be enough to affect them.

15. Q. How much irrigation could you get?—About 2 square miles are actually irrigated. There are about 5 square miles commanded. There is another one here which I call the Hurgurwa. It would irrigate about 70 villages. It is mentioned in page 8 of my report.

16. Q. Would the people take the irrigation steadily every year if they get the water?—Yes, they would. They want the water only for the ripening of the rice. For the *rabi* crop they depend upon the rainfall. I want to give them his water for the rice.

17. Q. Do not the . . . depend upon the rain?—They are irrigated chiefly by the *ahars*.

18. Q. Are there any other places?—There are others on the south.

19. Q. It would cost about Rs. 77,000. Is that the sort of thing you contemplated?—That is absurd. If any zamindar was to make it, he would be able to do it for about Rs. 10,000 and would make it well.

20. (*Mr. Allen*).—Mr. Lyall said that he could get the work done for Rs. 10,000. He said that the zamindar would give the land, but he did not know at what rate the earth-work would be done. I don't know at what rate the earth-work had been estimated for.

21. Q. The people in Palamau are they Rajputs, Babbans and Koeries?—They are Rajputs, Babbans, Koeries and other castes.

22. Q. You think that the scheme would be a profitable one?—A very profitable one. Both these schemes would be very profitable.

23. Q. I think you mentioned that you had a scheme in Bihar; what is the scheme?—There is a short rainfall here every two or three years, and the whole of this part, north of the Government lands, suffers very badly.

24. Q. This is next to Gya?—Yes. You see these two hills. They meet at this point. The distance from here to here is about 150 yards, and this is about 6 miles. My recommendation is that a masonry dam be built right across to connect these two. This will then form into a very big lake.

25. Q. How big?—This is about 6 miles now.

26. Q. How large would the dam require to be?—Mr. King, the District Engineer of Bihar, went with me, and he said that it would be a good thing to take the levels there, and that the cost of taking levels and of making the survey would be about Rs. 500. The Collector of Patna sanctioned Rs. 500 for taking levels and making the survey. Just then plague came into the district and Mr. King was otherwise occupied, and it could not be done and the money lapsed. If the scheme was carried out by a *bund* here, the whole of this place, which suffers very badly, would be irrigated, and the zamindars would pay for it. Here is the Panchanan river. The zamindar keeps a little channel for himself and jilts the whole of this water into his little *pains*.

27. Q. How long ago was this Rs. 500 sanctioned?—I got the money 3 years ago.

28. Q. Was Mr. Hare the Commissioner in those days?—I think Mr. Bourdillon was Commissioner; Mr. LeMesurier was Collector, Mr. King knows all about it. These are all solid rocks and he says that it is advisable. Another thing is that this is a Government village. These two villages belong to Government. This is called Gorakatora. This is all waste land. The water would irrigate the whole of this waste land and the whole thing would come under cultivation and Government would get a good revenue.

29. Q. On what do you base your estimate of Rs. 10,000?—Mr. King said that approximately it would take Rs. 10,000.

30. Q. (*Sir Thomas Higham*).—On both sides you have hills. You have only to make a dam across 150 yards. Has that been examined by anybody?—Not by anybody except by Mr. King.

31. Q. What would be the size of the lake formed?—About 6 miles long.

32. Q. It would irrigate a very large area?—Yes, it would irrigate the whole of this part.

33. Q. It was said about 300 acres?—That was only in the Government village. Then there is this land along here lying waste for want of water. We said that the cost to make the dam would be more than recovered by leasing out the waste land in village Ghorakatora.

34. Q. How many acres would you irrigate of the zamindari villages?—About 6 miles of this land would be under irrigation from this reservoir.

35. Q. (*Mr. Muir-Mackenzie*).—Do you think it probable that further investigation would lead to the discovery of other suitable schemes?—Yes, in South Bihar and chiefly in Palamau.

36. Q. You were asked whether in Palamau there were some very energetic cultivators and you said that the Koeries used the wells largely. Do you think that other cultivators who were equally energetic would use them?—Yes. The Koeries and Kisans are energetic cultivators.

37. Q. Do you think that the country is such that wells can be made?—Yes, in selected places.

38. Q. And irrigation made profitable?—Yes.

39. Q. What do Koeries work?—Chiefly garden produce and poppy.

40. Q. They don't do *cheena*?—Plenty of it.

41. Q. They do not raise fodder crops?—Paddy and wheat; but chiefly garden crops.

42. Q. *Cheena* is not a valuable grain; how many acres of *cheena* would a well irrigate?—About a quarter of an acre. *Cheena* is not sown to any large extent. The people do not cultivate more than a quarter or half an acre.

43. Q. If a well was devoted to *cheena* alone, how many acres can you irrigate?—It would depend upon the kind of well; if it was a large one, it would do for about 30 or 40 acres.

44. Q. Have you ever seen a well irrigate 30 or 40 acres?—Yes, I have seen Government wells in Bihar do that. I have seen Government wells 80 feet deep. I should say that the depth of water was less than 80 feet, but it was never dry.

45. Q. How high could you lift the water with these lifts?—20 to 30 feet.

46. Q. All these lifts were working night and day?—Yes.

47. Q. (Mr. Rajaratna Mudaliar).—Have you seen lifts worked by two men?—They always work with two men. One man stands at the side and both let it down and both pull it up.

Mr. D.
Sunder.

8 Nov. 20.

WITNESS No. 74.—The Honourable Mr. J. A. BOURDILLON, C.S.I., Member, Board of Revenue.

1. Q. (The President).—With what part of the province are you best acquainted?—With the Patna Division and Bihar generally.

2. Q. We should like to have your opinion about the Saran canals. Our enquiries show that the people there are very anxious to have irrigation?—The planters, the Collector, Mr. Hare, the Commissioner and others were all in favour of improving the canals, and I do not think that, from a technical point of view, there is any real obstacle. It is very much a matter of money. The canals are essentially faulty in system, and without considerable expenditure of money they could not be put to much practical use. The question is whether it is worth while spending the money.

3. Q. Securing any return for the expenditure appears to be the main difficulty; all our witnesses in Bihar, from the Collector downwards, were of opinion that, if the canals were improved, the benefits would be so great that it would be fair to impose a cess of $\frac{1}{2}$ anna in the rupee of land revenue, in the same way as the embankment cess is levied in Saran. Mr. Macgregor said that the people were actually clamorous for irrigation. In Parulia we examined Mr. Slacke, formerly Collector of Saran, who was very emphatically opposed to the scheme. Yesterday we examined Mr. W. C. Macpherson, also a former Collector of Saran, and his opinion was very much the same as that of Mr. Slacke. There is thus this great diversity of opinion. We would like to know your view on the subject?—I am inclined to support Mr. Macpherson and Mr. Slacke. I cannot admit the fairness of imposing an irrigation cess upon the whole district in order to benefit practically only a part of it. It is perfectly true that Saran would benefit in a general way by there being no famine, just as the whole province would benefit, but beyond this general advantage I do not see why more than half this district, which would get nothing whatever from irrigation, should have to pay for it. As far as I can remember, Saran contains 1,712 square miles, or 1,095,680 acres, and according to Colonel Haig's estimates, not more than 100,000 acres would be commanded by the canals. Saran practically requires irrigation less than any other district in North Bihar, because it is a three-crop district. Whenever we have a famine in Bihar it comes from failure of the winter rice crop. But rice is not by any means so important a crop as it is elsewhere. *Rabi* is the most important, representing 40 per cent., and then comes *bhadai* with 32 per cent., and, lastly, the *aghani* rice with 28 per cent. These are the figures which were available at the time of the famine in 1896-97; they have been altered somewhat since in the Settlement Report, but the general proportion remains the same. Then again the cost of making these canals really effective would be very great. At present they are only a combination of drainage channels and low-level canals, and are consequently most difficult to work. They have, as far as I know, never been properly surveyed and levelled, and are essentially low-level canals. Besides this they suffer from the serious disadvantage that the water-supply at the head is extremely precarious. The water is taken from the Rupanahap *sota*, which is liable to be closed at any time by the shifting of the river or the silting up of the mouth of the channel itself. In the face of such a danger no one would spend money on these canals without much hesitation and fuller proof that they are absolutely required.

4. Q. It would be too costly to take the water from the Gandak itself?—Yes.

5. Q. The canals as they now are have always been a failure?—In my judgment the scheme was a crude and incomplete scheme when started, and it has never been well worked. It was essentially a scheme for providing water at all times and in all years for the manufacture and irrigation of indigo, and the irrigation of food crops was a secondary consideration. Now that indigo has failed so greatly, more water would probably be available for the irrigation of other crops, but the interest of indigo planters, who were the promoters of the scheme, would necessarily be smaller.

6. Q. We heard the evidence of Mr. Ogilvy, Manager of Hutwa Estate, who was anxious for two more sluices further up. He said that they would bring in the whole of

this estate within the irrigable area?—Yes. He must have been speaking of the Dahn; this is only one of the four rivers or canals. It takes off from the Rupanahap *sota* higher up than the others, and therefore it is the best in point of position.

7. Q. He also mentioned another stream which might be used the Jharai?—That comes from far away and has nothing to do with the Saran Canal system; it rises, or takes off, from the Gandak in Gorakhpur and not in Saran.

8. Q. To change the subject: we have considered a number of canal schemes for the northern part of Champaran, and almost everywhere we have been brought face to face with the difficulty that the Nepales might cut off the supply of water. That difficulty seems insurmountable?—It is an immense and ever present difficulty which has always been felt, and applies to practically all the hill streams, except the great rivers.

9. Q. On that account we were impressed with the importance of the Tribeni scheme, and we are writing to the Government of Bengal, suggesting that the masonry works might be made on a larger scale so as to allow of the future extension of the scheme. There is one river we are told, we might rely upon, and that is the Kanala, which, it was said, was so big that it could not be banded up?—Yes. There is also the Bagmati which is another large river.

10. Q. The Bagmati scheme hardly recommends itself to us?—When I was Commissioner I reported against it, because the scheme is not really required and would be very expensive. Next, there is the question of the Eden Canal. I suppose it was not intended in the Burdwan Division for famine protection, but that in this part irrigation is highly prized?—Yes. It took a long time for the canal to become popular, but the people have gradually come to realize its value. If I remember right, when I was Commissioner of Burdwan, we had a system of leases for 3 and 7 years, and sometimes it happened that, during the period of lease, irrigation would be required only once. It took a long time for the idea to soak into the popular mind, but at last they did realize that the lease was a useful insurance. On the Sone canals the rayat learnt the lesson faster. The extension of the Eden Canal is out of the question, I believe, unless you have a weir across the Damuda; but this is outside of the area requiring protection against famine. That is so.

11. Q. With regard to the Sone Canal, we had strong evidence of the necessity and demand for irrigation in the Bhabua Sub-division. There is a memorandum on record, prepared by Mr. H. C. Levinge, formerly Superintending Engineer, showing that there are great storage possibilities on the Kaimur plateau?—I think it is very important that irrigation should be extended to Bhabua: it is the only part of Shahabad which is not irrigated. The Commission are no doubt aware that it was intended to irrigate Bhabua from the Sone. The great western canal is down on the maps, but the works have never been carried out, because it was found that it would be impossible to fill them. The Engineers have been disappointed with the amount of water which they can get from the Sone. It is with the greatest difficulty that, in times of scanty rainfall, they can fill the existing canal with water.

12. Q. We are anxious to know particulars with regard to the revenue derived from the Sone canals; the interest paid on the capital; how much of that capital is due to navigation and how much to the work of the canals. Mr. Horn's idea is that the estimate might have been cut down quite 20 per cent., because the canals are absolutely valueless for navigation?—Certainly; the navigation receipts are quite trifling.

13. Q. It is hardly fair to debit the irrigation scheme with that part of it?—No.

14. Q. Do you think highly of the Tribeni scheme?—I am a very strong supporter of it and have been all along.

15. Q. We find generally a great deal of indifference with regard to well irrigation. In some districts we are told

Mr. J. A.
Bourdillon.

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Mr. J. A.
Bourdillon.

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that the people will not take to well irrigation, especially in Chota Nagpur?—Wells are pretty well known and used in Bihar, especially in Saran, and in the country all round Patna, where there is a great deal of garden produce. Where you have good cultivators, they go in for wells and ask for small loans. They do not work small wells so much by bullocks as by levers. In 1896-97 Mr. Finucane was Famine Secretary. He was very anxious that advances should be given for making *kachcha* wells all over the division: but no district took advantage of them to any extent except Muzaffarpur; elsewhere they were entirely rejected. What the people said in excuse was that they did not like well water for irrigation, because it was too cold, and that when once you irrigate any land from wells it must always be irrigated from wells.

16. Q. I wish to ask one or two questions about the famine programmes. Would you tell me what kind of works were principally executed during the last famine?—Mostly roads and tanks. Tanks predominated in Ohamparan and roads elsewhere. Out of 801 works undertaken during the period of scarcity, 401 were tanks, 410 roads and 81 neither the one nor the other, being mostly sections of railways or canals.

17. Q. What was your opinion with regard to their general utility?—I think that almost, without exception, they were extremely useful. I believe our works will be always useful.

18. Q. We had some evidence from Bihar to the effect that roads were made in areas where they are not wanted?—Where there is such a dense population as in Bihar, a road is always an advantage, but there is sometimes the difficulty and expense of keeping them up and maintaining them, if they are made of a pretentious character.

19. Q. We have been told that the districts had quite sufficient roads?—I do not agree with that. I believe that every road that was made was an improvement.

20. Q. With regard to the tanks, were they all useful for irrigation?—Their main object was not always for irrigation, but mostly the supply of water for cattle and for general convenience, and, to a subsidiary extent, for irrigation.

21. Q. You consider these tanks to have been works of great utility?—Not of the very first class of utility perhaps, but still they are very useful.

22. Q. They have great advantages as works for supplying relief work?—Yes, a large number of workers can be concentrated in one place, and you can easily control them.

23. Q. Would you not rather see them replaced by works more useful for irrigation in the shape of canals?—Yes, if it could be done, but comparatively few of these can be devised and carried out in Bihar.

24. Q. Would you be in favour of making these *pains* for relief works? After having the country very carefully surveyed and ascertaining the possibility of making cuts and *pains*, would you object to providing them as famine works and wells also?—I have no objection to that.

25. You only go so far as to "say there is no objection." You do not say that it is very desirable?—It is desirable; but there is always the difficulty of acquiring land and rights in water. There is no difficulty as regards tanks. The zamindar gives the land, and he makes arrangements with the tenants about the water and the fishing.

26. Q. Is there any chance of his giving land for the *pain*? The *pain* would probably run through several villages, each of which would probably be the property of many land-owners, and it would be very difficult to get all the proprietors to agree together to give the land: this combination would be absolutely necessary before you make it. As District Officer, I have often tried to make cuts and channels; but I have always failed by not being able to get all the parties to agree. Of course it may be done by Government acquiring the land, but as an individual officer I was foiled again and again.

27. Q. I suppose Mr. King was confronted with this difficulty?—No, I think not, because all the lands in which his channels were constructed were in villages which belonged wholly, or in great part, to his employer, the Maharaja of Darbhanga.

28. Q. It is hardly necessary to ask how famine programmes are prepared. We got that from Mr. Macpherson?—I have not seen one for four years, i.e., since I left the Patna Division. The Board have had nothing to do with famine work since the Orissa famine of 1886, after which they were relieved of all famine duties.

29. Q. As Commissioner you prepare all famine programmes?—No. They are prepared by District Officers, but the famine programme comes to the Commissioner for

criticism and examination, and is finally approved by him before it goes on to Government.

30. Q. You think there is sufficient time to prepare them?—My experience is that they are never ready. We were taken unawares in 1896-97, and so we shall be again, unless special efforts are made to prevent it. When I was Chief Secretary, I was constantly urging the importance of famine programmes and of having them ready. District Officers and District Engineers do not sufficiently realize their importance. After seeing, while on the Famine Commission, how other provinces were caught unawares in 1899-1900, I have tried to do all that was possible to guard against a similar failure in Bengal. It is impossible to pay too much attention to this subject.

31. Q. You would have complete plans and estimates?—Not for the smaller works; but I would for all the larger ones, and as to the smaller ones, I would specify that such and such a work should be carried out in or near such and such a village.

32. Q. Sometimes you find in particular villages very great difficulty in finding works of utility?—Tanks are useful almost everywhere where the population is very dense and old tanks can be cleaned or deepened, or new tanks dug. If you do not get a suitable work in one village, you get it in another. These tanks are useful not so much for irrigation, but for cattle: *ex hypothesi*, when there is a failure of the rains, the tanks are generally dry, and little irrigation is possible. Few of them contain springs.

33. Q. (Mr. Muir-Mackenzie).—I would like to ask you one or two questions about *takari* advances. Hitherto the loans advanced in years of famine have been of very small amount; what is the reason?—I think the explanation is the same in most provinces. The people do not like to become the creditors of the Government for two reasons. First of all, the Government is very punctual in exacting payment. Secondly, I do not think so many advantages are given as might be done in the way of distributing the advances. Applicants have to come several times to head-quarters to settle matters, and they have to run the gauntlet of a whole series of underlings. It is more their custom, if they want money for any purpose, to get it from their own local *mahajan*. They pay more interest, but they get it more easily; payments are more elastic and renewals are possible.

34. Q. Do they borrow for agricultural improvements?—No, not much for purposes of large improvements, but when they do they go to him.

35. Q. For wells?—For wells also.

36. Q. Do you think that *takari* advances should be given on a much larger scale in the provinces?—I think they should. The expansion would take time. It would require to be pushed by particular men. The personal equation is very important in this matter.

37. Q. Would you be glad to see it pushed?—I would for wells especially.

38. Q. Do you think there would be any difficulty on account of security in giving advances to the tenant class?—I don't see why there should be any. In the part of the country that I know best a large proportion of the tenants have occupancy rights, and I do not see why there should be much difficulty.

39. Q. Do they mortgage their holdings; do they give *salami*?—The answer is yes to both these questions.

40. Q. Do you think that, as a matter of fact, the land-owners would be willing to give up *salami*?—Not willingly: the Maharaja of Hutwa always took *salami*. He would not give wood for the well-kerb, nor would he allow a tree to be cut down for burning bricks, till he had received his *salami*.

41. Q. Do you think that could be overcome?—It was overcome in the Hutwa Raj. Mr. Tytler of the Opium Department had great influence with both tenants and landlords, and he used his influence to such good effect that he managed to persuade the Maharaja and others to waive part of their claims. By means of personal influence some of these difficulties can be got over.

42. Q. Even where the record-of-rights has not been prepared, the *ryat* understands his position sufficiently well?—There would always be much ignorance; but I believe that everywhere the tenant is learning to know how far he can go and how far the landlord can raise his rent.

43. Q. Do you think that it is not possible to make them better informed?—Yes, by the efflux of time they will learn their rights.

44. Q. Do Revenue Officers go about and tell them what their rights are?—When they do, the result is not always

what they expected. I would not advocate a man going about preaching propaganda of this kind. The record-of-rights informs them all of what their rights are. As it is prepared, it teaches them their rights, but in a slow dignified fashion.

45. Q. Does the record-of-rights, as at present framed, embrace any rights in water?—I don't think so.

46. Q. I understood from Mr. Finucane that orders were given that a record-of-rights in water should be embodied in the Tikari Raj survey?—It may be so, but the matter never came to my notice.

47. Q. Would you advocate the preparation of a record-of-rights in water?—If they could be reasonably ascertained I would.

48. Q. Do you think they would be difficult to ascertain?—They could be ascertained, no doubt, by enquiry.

49. Q. If they were ascertained and a record made by the Collector, do you think he should have power to enforce the observance of these rights? Do you think that the Collector should be given this power?—I think so. I would rather that the Collector had it than the Civil Court.

50. Q. We have had a representation on the part of some zamindars in Bihar that landlords had some difficulty in obtaining enhancement of rent for improvements made by them in spite of the provisions of the law. Do you believe that to be the case?—I cannot remember having heard of a case of the kind. I do not think one has come to my notice hitherto.

51. Q. Do many landlords apply to have improvements registered?—In the Patna Division one landlord, the Maharaja of Hatwa, made a great many applications, but for the most part few improvements are registered.

52. Q. Did these applications involve criticisms as to whether they were improvements or not?—Everyone of them was enquired into.

53. Q. Were applications ever rejected on the ground that it was the business of the zamindar to keep the works in repair, and that he was only performing a duty and that it could not therefore be called an improvement?—Yes, I think 10 per cent. of the applications were rejected on that sort of ground. In other cases of unsuccessful applications the ground of rejection was that the improvement was a small matter and not worth registering.

54. Q. When an improvement has been registered and the landlord finds that the tenant objects to pay enhanced rent, he has to go to the Civil Court. Would he prefer that he should get his enhanced rent from the Collector? The Collector has registered the improvements; he knows all about the facts, and it seems a certain waste of time to go to the Civil Court?—This would be a fresh departure from the established custom, because all these enhancement cases have to be brought not into the Revenue but into the Civil Court. It would be a departure, but I dare say that the Revenue Courts would do it much more quickly.

55. Q. You don't think that this would greatly encourage zamindars to get enhancement of rent?—I don't know that they take that possibility much into their consideration, nor do I think that it would effect their action.

56. Q. When they make an improvement, do they get tenants to make contracts for higher rent?—Yes, this is done. It was done a great deal in the particular case which I have mentioned.

57. Q. A landlord, really desirous to make improvements like the Maharaja of Hatwa, would make contracts with all his tenants?—I believe not formal contracts with all. It would often be a matter of vested arrangement.

58. Q. With regard to the tenant, who by law is protected from enhancement on account of improvements made by himself, do you think that, as a matter of fact, that law is got round?—Very possibly it is. I cannot speak from experience.

59. Q. Can you give us any idea as to how much money was spent in the famine of 1896-97 on works that are useful for irrigation?—I cannot say this off-hand, but I can look into the district reports and let you know, if required.

60. Q. But more is spent on other relief works?—We again come back to what I said about the density of population in Bihar; that dense population makes it reasonable to carry out works which do not lead up to irrigation, such as roads and non-irrigation tanks. It might not be reasonable in a more thinly populated province.

61. Q. (Mr. Rajaratna Mudaliar.)—With regard to the granting of loans, is there any difficulty in the matter of security?—There certainly is very often. Where there has been a survey and record-of-rights, there would not be very much. Before the survey came up to Bihar we had great difficulty in finding out about security. The Collector had to be very careful. Enquiries were made locally in all cases, but even so he was sometimes deceived.

62. Q. As regard previous mortgages, could you not find it out from the registration records?—We did so, but we were sometimes deceived.

63. Q. In the Madras Presidency, in every case before a loan is granted, the Collector takes an encumbrance certificate from the Registration Office?—If that were to be done, there would be no difficulty?—That was done as far as possible, but still there was difficulty. In Saran and other districts, where there are non-official Europeans, we generally get help from the planters. Of course their knowledge is not very extensive, but they would be able to give information regarding the financial condition of men in their own villages.

64. Q. (Mr. Allen.)—I would like to ask you one or two questions about the Land Improvements Act. The rules under this Act do not provide that applications to the Collector may be made over to the Sub-divisional Officer to grant advances. Do you think that the rules should be amended to provide powers of this kind?—I have no objection at all.

65. Q. And should these loans be vigorously pushed?—Yes; I should like them pushed. More can be done than is done at present.

66. Q. The preparation of estimates of expenditure under the Land Improvements Act is apparently conducted in a very formal way, and the result is not satisfactory?—One reason is that in most districts there are very few applications. The figures for one year will serve for any future years.

67. Q. If these loans were vigorously pushed, the total expenditure of the province would very much exceed the present expenditure?—No doubt it would.

68. Q. You are of opinion that the Collectors ought to be urged to push the grant of these loans in a more vigorous manner?—I certainly think so.

Mr. J. A.
Bourdillon.
8 Nov. 02.

TWELFTH DAY.

Cuttack, 11th November 1902.

WITNESS No. 75. —RAJA BAIKUNTHA NATH DE, Bahadur, of Balasore.

1. Q. (The President.)—You are a resident of Balasore, I understand?—Yes.

2. Q. I suppose you know the Orissa Province very well?—Yes, I belong to this province.

3. Q. Were you here in the famine of 1865-66?—Yes.

4. Q. Did two monsoons fail, or only one at that time?—Two.

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5. Q. In the year 1865-66?—Yes. That is, in August the rain ceased and there was no rain till the end of the year in 1865.

6. Q. And then in 1866?—Then there was good rain.

7. Q. I thought you said that for two seasons there was no rain?—No, only one season there was no rain.

8. Q. That caused great loss of life?—Yes.

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9. Q. Was that throughout the whole of Orissa?—Yes, and part of Bengal.

10. Q. Do you think that such a thing is possible again?—No.

11. Q. Why?—Because the canal, steamers and railways are open now. Consequently they will bring up grain where there is any demand for it.

12. Q. The railway will bring up the grain, I suppose and also the navigation in the canals. Is there much navigation on the canals still?—Not since the railway has been opened.

13. Q. (Mr. Muir-Mackenzie.)—Was the railway opened in 1896-97?—No, only three years ago the railway was opened.

14. Q. (The President.)—There was no railway in 1896-97?

15. (Mr. Gupta.)—The railway was opened in 1899-1900.

16. Q. (The President.)—Well now you say famine cannot occur again owing to irrigation and to the means of bringing supplies from outside?—Yes.

17. Q. And these means would be chiefly the railway and also I suppose the navigation canals?—Yes.

18. Q. I suppose if the rice crop was to fail, the canals would be used much more for navigation; there would probably be number of more boats on them?—Certainly.

19. Q. There is one whole district here which has no irrigation; there is no irrigation at all in Puri?—There is no irrigation in Puri.

20. Q. Is it all secure, do you think, as well as the others?—Irrigation is the only preventive for famine, and if irrigation works are constructed, it will do more good to the people than the railway and other things.

21. Q. That protection is better than merely transportation?—Yes.

22. Q. Is there much trade on the coast at False Point?—Not this year particularly.

23. Q. Is there anything to speak of in Chandbally?—The same thing.

24. Q. The railway takes it all?—Yes.

25. Q. Have you got irrigation in Balasore?—Only in Bhadrak.

26. Q. That is from the high level canal?—Yes.

27. Q. And the canal stops at Bhadrak; does it not?—Yes.

28. Q. Is there demand for irrigation in Balasore? Would they like to have irrigation there?—Yes; we want that a canal should be joined between Midnapore high level and the Bhadrak canal.

29. Q. That would be very expensive. I suppose it would mean crossing a number of rivers; would it not?—Yes, but it would save a great deal.

30. Q. How?—The lands which suffer for want of rain now would get good outturn, and it would also supply drinking water, the chief want of the people now.

31. Q. Really?—Yes.

32. Q. Do they sink wells?—Very little, but not for cultivation.

33. Q. But for drinking purposes?—Yes. The cost of a well in Balasore is much more than in Cuttack and other parts. Each *pakka* well costs from Rs. 200 to Rs. 300.

34. Q. How deep do they require to go?—About 35 to 40 feet.

35. Q. I suppose they make tanks for cattle drinking?—Yes, for cattle, as well as for drinking themselves.

36. Q. Do *kachcha* wells last at all?—Not at all.

37. Q. Do the people take canal water now more than they used to do before?—Yes.

38. Q. At first they took very little?—But now they are using it.

39. Q. And do they take all they can get?—Of course.

40. Q. Every year?—Every year.

1. Q. Even when there is good rainfall?—When there is good rainfall. Of course there is very little demand.

42. Q. Is the irrigation all given on leases?—Now they are given on leases.

43. Q. And only on leases?—Only on leases.

44. Q. How long do these leases last; five years or seven years?—Now I learn these leases date for 10 years.

45. Q. Do you know the country to the south? Have you ever been in the Gadaveri District?—No.

46. Q. What is the description of rice grown here? Is it a good kind of rice?—Yes.

47. Q. How many seers of paddy do they get from an acre here?—On an average 25 to 30 maunds.

48. Q. *Pakka* maunds?—Yes.

49. Q. Is that irrigated land or unirrigated land?—If there is good rainfall, unirrigated land.

50. Q. Now do you remember when you were younger long ago; did they always get as much rice for an acre?—Yes, always the same.

51. Q. I have got a report here of the year 1878 when it is said they only got 600 seers of paddy for an acre?—They may refer to some particular land.

52. Q. Do you think it was a mistake?—Well, my experience of course is that it has always been 25 to 30 maunds of paddy per acre. That will come to 12 to 15 maunds of rice.

53. Q. Generally they have only one crop of rice here?—Yes.

54. Q. Have there been any complaints here that parts of the country have been made into swamps by the irrigation? Have you heard of any injury done of that sort?—I have not heard it.

55. Q. The water flows off all right?—Between the embankments of course.

56. Q. Have you any suggestions to make as regards the improvement of the irrigation here, or any extension of it which you would think would be good? You have already mentioned a canal to join the Bhadrak and Midnapore canals. Is there anything else that you think might be done?—The country being undulating, dams should be constructed here and there to keep up water for irrigation purposes.

57. Q. You mean among the hollows?—Yes, and that will cost very little in comparison to the canal.

58. Q. They will both cost a good deal. I mean to say do you think you will ever get 4 per cent. for your money, or anything of that sort out of it?—We are paying a public works cess, and that of course can be met from the public works cess.

59. Q. Does that not go upon roads?—Only the road cess goes upon roads.

60. Q. What does it go upon then; upon embankments?—On embankments, and of course upon works preventive of famine.

61. Q. (Sir Thomas Higham.)—The cultivation of rice is carried on absolutely without any assistance from irrigation works of any kind in Balasore?—Yes.

62. Q. Are there no tanks?—There are tanks, but their number is very limited.

63. Q. They are in private lands?—Yes.

64. Q. Are there any private channels out of the rivers for conducting water to the lands?—No.

65. Q. They depend entirely on the rainfall?—Yes.

66. Q. When did you last have a great failure of crops?—A partial failure occurs every three or four years, but since 1866 there has been no famine.

67. Q. Were you here in 1866?—Yes.

68. Q. You remember 1866?—Yes, I was honorary relief officer then.

69. Q. Was the famine very bad there then?—Very bad.

70. Q. Due to drought?—Yes.

71. Q. Do you ever lose a crop in consequence of floods?—Yes, sometimes.

72. Q. How often?—In the course of ten years three or four times; we have a partial failure of crops owing to floods.

73. Q. Can you suggest any remedy for that? Is it possible to prevent that?—If the high level canal is made, every river should be embanked, and it will protect the river-side lands from inundation, and will especially do immense good to the Bhadrak Khasmahal if the Salandi river is embanked.

74. Q. You would have to embank all the rivers?—Of course.

75. Q. Supposing the high level canal were made, would people take water every year?—Yes.

76. Q. They get on very well without irrigation now. Why would they take water?—They will get two crops instead of one by using canal water.

77. Q. You would like to see that canal made all the way to Midnapore?—Yes, that will serve as a feeder route to the railway station as well.

78. Q. You mean to say it will make it navigable?—Yes.

79. Q. (Mr. Muir-Mackenzie.)—Did the rain fail in August in Balasore in 1896-97?—Yes.

80. Q. Did it fail as badly as it did in 1865-66?—Not so badly.

81. Q. And you really think if the rain failed again as badly as it did in 1865-66 you would not have any famine?—Of course there may be scarcity, but not famine.

82. Q. If it had failed as badly in 1896-97, would not there have been famine then?—No.

83. Q. Why?—There were steamers plying to the Orissa ports and the railway was opened.

84. Q. But the railway was not open in 1896-97?—But there were steamers and the canal.

85. Q. And the canal would have stopped it, you think?—Yes, that is the coast canal; the navigation canal would.

86. Q. It would stop it by bringing in grain?—Yes.

87. Q. (Mr. Rajaratna Mudaliar.)—You said in Balasore the people would cultivate two crops. But, as a matter of fact, they don't seem to raise two crops under the Orissa canals?—Yes, they are.

88. Q. A very small area?—A very small area. But in Balasore there is nothing left to them to grow, but this one crop. They are more advanced than the cultivators of this part; I mean of Cuttack and Puri; Balasore being a neighbouring district to Bengal, they know a variety of crops to grow on their lands.

89. Q. Are your Orissa *raiya*s so ignorant as not to know the benefit they will get from a second crop?—They are very backward in that respect.

90. Q. That is the only reason for their not growing a second crop?—Yes.

91. Q. The water is available in abundance?—But they are quite satisfied with the little profit they get, and they are home-loving people.

92. Q. Do you think the soil is suited for a second crop in Orissa?—Yes.

93. Q. What is your opinion as to the present period of leases for 10 years? Do you think that period might be extended with advantage?—No; it should be shortened.

94. Q. Why?—Because there may be a good many changes during these years.

95. Q. Would it be beneficial to the *raiya*s to shorten the period?—Yes.

96. Q. In what way do you think?—Those who are in need of water should take a lease, but those who are not, when they have executed a lease, cannot surrender it at any time they like.

97. Q. Within that period they cannot surrender?—Yes.

98. Q. But is there not an advantage on the contrary due to the fact that the rates will not be raised during that long period?—The rates have already been raised from Rs. 1-8 to Rs. 1-12. That is too much.

99. Q. That is true; but it may be further raised whereas with a 10-year period they will be certain that the rates will not be raised during that long period?—At the same time of course if there is no demand for water, why should they pay their rents; and it will in a way reduce the value of land in the market.

100. Q. What is the average rent they pay to the proprietor besides the water-rate?—It varies from Rs. 1-5 to Rs. 2.

101. Q. Per *bigha* or per acre?—Per acre.

102. Q. It does not exceed Rs. 2?—Generally it is not more than Rs. 2. Sometimes it is Rs. 2-8; but the area of such lands is very limited.

103. Q. Have you seen the Godavari delta?—No.

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WITNESS No. 76.—BABU GOURI SHUNKER ROY, Editor, *Utkal Dipika*, Cuttack.

1. Q. (The President.)—You are the editor of a newspaper here?—Yes.

2. Q. And you also own lands, I understand, in this province?—Yes, I have lands here.

3. Q. Has this always been your province?—Yes, only in my part of the district. I am not acquainted with other parts of the district.

4. Q. In your capacity as editor you probably hear what is going on?—Yes, that I do.

5. Q. Have you always been here?—Yes.

6. Q. You must remember the famine of 1865-66 very well?—Yes.

7. Q. I suppose there was a great deal of distress at that time?—It was very severe.

8. Q. And there were a number of deaths?—Yes.

9. Q. There was one year, 1865, I understand, when there was very little rain. Do you remember now; was there any rain at all fell in 1865?—There was a total stoppage of rain from the middle of August and throughout the season.

10. Q. Was the rain all right in 1866?—Yes, it was rather more; and there was failure by inundation floods.

11. Q. When was the greatest distress, after the inundation, or after the failure of the rain?—After the failure of the rain.

12. Q. That was the worst time?—Yes. When there was the inundation, by that time Government relief works had been established to a large extent.

13. Q. Comparing 1865-66 with 1896-97, I understand the province did not suffer nearly so much in 1896-97?—No. In that year there was no rain till December.

14. Q. When, in 1896?—No, in 1865-66. In 1896-97 there was rain, but it came late, so a large part of the crops failed.

15. Q. The loss was not so great as it was in 1865-66?—No, certainly not. Of course part of the cultivation was protected by the canal.

16. Q. And what happened about those parts which were not protected by canals like Balasore and Puri?—In my district on the northern side of the Nona river there is a canal and on the southern side there is no canal; that part suffers from floods now and then.

17. Q. Were the crops lost on the part south of the river in the year 1896-97?—Yes, to some extent. There was rain, but it came very late, so the crops on the high lands dried up and those on the lower lands were saved.

18. Q. Do you think it is ever possible that there should be any great calamity like the famine of 1865-66 again?—Well, it is very difficult to say that, but then of course one part of the country having been protected by canals, the chances are much less than what they were before.

19. Q. Do you think the district of Cuttack is quite sufficiently protected by its canals?—No, but my opinion is that as much as can be done has been done.

20. Q. But still if more could be done, do you think it ought to be done, or do you think the protection is sufficient?—Well, I don't see how it could be done. Even now parts known as protected are not quite protected.

21. Q. (Sir Thomas Higham.)—Not protected from floods you mean?—No, from drought. The reason is that it takes too long to distribute canal water. Of course two or three miles from where it begins the people get sufficient water, but by the time it comes to the end everything is over nearly.

22. Q. (The President.)—You mean the water does not reach the end?—Sometimes the water does not go so far. This year there was a very severe dry for water, and there were about forty or fifty acres of land close to my cultivation, where the people pay a water-rate and are supposed to get canal water; the water could not go there, so at last I advised the people and they erected a *bund* on a drainage channel, and when that was done, water went there. But then it is very difficult to have them bunded according to the needs of the people, because the Public Works Department make objections to bunding the drainage channels. Of course a good deal of water runs to waste by the channels.

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23. Q. Have you got a lease for irrigation? Do you pay anything?—Yes, I do pay.

24. Q. For how many acres do you take a lease?—I have some eight acres for which I pay a full rate and for one acre I pay a lower rate at the rate of eight annas, for which I do not require the water, and it should not have been assessed at all, because it does not suffer from drought.

25. Q. Is your lease for ten years?—I cannot recollect now. I have of course leased it for a very long time, because I cannot get a good crop without water.

26. Q. Do you think there is anything more the Government should do here to make the province better fitted to withstand famine? Are there any steps that you would suggest?—In the unprotected parts.

27. Q. Yes, throughout this province of Orissa are there any steps you would suggest?—I know of a small river which flows past my land. A still channel and embankment have been made on the southern bank of the river, which has stopped the mouth of that nullah, so that the water does not come by that way and the people suffer. I also myself suffer from it. Once I asked the Executive Engineer to cut it and he gave me permission to cut it on a deposit of Rs. 20 being paid, in order to put it right after the water had flowed. One year I paid the fee and opened it, but the flood did not rise, so it was wasted. The next year I also applied and opened it and the flood that year was rather heavier, so it went over a larger part of the *bund* and I was made to pay extra. This made me stop applying to have it opened any more.

28. Q. (Sir Thomas Higham.)—Where is your village?—Pergannah Anurawor.

29. Q. What canal waters by?—The Kendarpura canal and the nullah I am speaking of is on the other side in Mouza Jamra. It is a subordinate tenure held by me and some other shareholders.

30. Q. How much land have you got?—Well, on the canal side some 25 acres, part of which is commanded by canal water.

31. Q. How do you get water for that? Do you apply for a lease?—No. Of course the portion that can be leased I have taken a lease for, but there are parts higher up where the water cannot reach, and there I have dug two tanks, and when there is very severe scarcity I bale water from these tanks and save the crops any how.

32. Q. Some of your land is too high to be irrigated by the canal?—Yes.

33. Q. And in dry years you bale water on to it?—Yes. This year the drainage channel was *bunded* and I got part of my lands irrigated that way.

34. Q. When you apply for a lease, do you apply on your own account, or do you apply in partnership with other people? All persons having lands in a plot must apply before the lease is granted.

35. Q. What is the size of the plot?—Sometimes 50 acres or 60 acres or 100 acres.

36. Q. Then you apply with four or five other people, I suppose?—With about 20 or 30 other people of the village.

37. Q. In your lease?—Yes.

38. Q. Then you have to pay for every acre of land in your block. Supposing you don't take water on to it, what happens then?—Whether I take water or not, I have to pay. This year I and my fellow-villagers availed for a lease only two days before there was good rain; we used the canal water for only two days and a portion of our land only was irrigated, and then God blessed us with good rain, but we had to pay for the whole amount all the same. I don't know whether there should be any consideration for that.

39. Q. You had a very good crop?—Whatever crop there was was given by the help of the rain. It is only when we found the crops dying for want of water we applied for it. It is only like administering medicine to hopelessly sick men.

40. Q. If you apply for a lease for five years, you do not know whether there is going to be rain or not? Your lease is for five years?—Yes, but in some years we may not want a drop of water.

41. Q. In a wet year do you put water on to the land or not? If there is good rain do you take canal water?—No, I don't require it.

42. Q. You take it?—If they let it out, when it becomes too damp, we have to apply to them to stop.

43. Q. Then you don't take it yourselves? It is let on to you?—It is always let on.

44. Q. Is the rice any better for having canal water in a wet year?—Canal water is no better than rain water.

45. Q. But you can put more water on; you can water more regularly?—That is also sometimes done. In certain stages of field operations we want more rain, but when there is no rain, of course we have to use canal water.

46. Q. Does not that improve your crop? Don't you get a better crop than if you only relied on rain water?—In some lands we get better crops and in some lands worse.

47. Q. Why?—The higher and drier lands are benefited by canal water, but the lower lands become more damp and swampy and do not produce so much crop now as we used to get before.

48. Q. Are your lands protected by the canals from inundation?—Yes, where there is a canal, of course there is protection.

49. Q. There are no *bunds*; are there?—Yes, there are *bunds* on the river side, but sometimes the embankments give way. One year an embankment gave way and my fields and my farm-houses were all swept away. That was accidental of course.

50. Q. Then the canals do you some good by protecting the lands from floods, even when you don't want water?—Yes, but they do harm in another way. They deprive us of the silt which used to enrich the land.

51. Q. (Mr. Rajaratna Mudaliar.)—Do you raise a second crop on your land?—On lands where early rice is sown; there of course other crops are raised.

52. Q. Is there any certainty as to your getting a full supply for a second crop, if you raise a second crop?—No. This year of course there was rain and it was all right.

53. Q. Independent of that, the canal water is always available?—The canal water is available up to November; not after that.

54. Q. (The President.)—Is the canal water not running in December?—The time is from the 16th of June to the 25th of November.

55. Q. That is for your lease; that is for one crop?—Yes, and then whoever wants can get water where there are lands suited for a second crop.

56. Q. (Mr. Rajaratna Mudaliar.)—Is any large area in this district suited for second crop cultivation?—Yes.

57. Q. And yet the *raiyats* don't take canal water?—Sometimes they also grow the *moong* crop when there is rain in December or January when water is required for sowing the land, but the second crop area is very limited.

58. Q. Why is it so?—It is owing to other causes, because everybody grows rice, but everybody does not grow a second crop; hence the fields are not well looked after; the people in disgust don't do it.

WITNESS No. 77.—BABU JAMINI MOHUN DAS, Deputy Collector, Cuttack.

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11 Nov. 02.

1. Q. (The President.)—You are Settlement Officer here?—I was Assistant Settlement Officer, but now I am employed on general duty in Cuttack.

2. Q. Were you here all the time the settlement was making?—I joined the settlement in October 1892 and I remained on till the end of the operation.

3. Q. About eight years?—Nearly eight years.

4. Q. You were with Mr. Maddox?—Yes; he was Settlement Officer.

5. Q. You were here during 1896-97?—Yes.

6. Q. Was the scarcity much felt at that time?—There was a little distress; it was not much felt in Cuttack.

7. Q. Were there any relief works started?—There were no relief works in the part where I was on settlement duty.

8. Q. Did the prices not get very high?—The prices did get fairly high, but that did not cause much distress.

9. Q. There was a complete failure of the rain in August, was there not?—The rain ceased abruptly in September in the early part, and there was no rain from the date when it ceased in September to the end of October and also to the beginning of November.

10. Q. About what time in September did it fail?—During the first half of the month.

11. Q. What districts were you in?—In the Cuttack District.

12. Q. Have you had anything to do with Pari or Balasore?—No. I have seen a portion of Balasore and also a portion of Pari.

13. Q. Cuttack is well protected by irrigation?—It is very well protected. I don't think there will be any famine or any severe scarcity in Cuttack.

14. Q. Pari and Cuttack have no irrigation?—In Ibadrak there is a little irrigation; Pari has none.

15. Q. Do you think in the year 1896-97 that the people were much better off in Cuttack than in Pari and Balasore?—I think they were very much better off in Cuttack than in Pari. There was some relief in Pari, but none in Cuttack or Balasore.

16. Q. Do you think there is any likelihood of there being a famine here again in the way there was in 1865-66?—I don't think there will be any famine here and that is due entirely to the irrigation works.

17. Q. I suppose you consider that the railway would have something to do with it in future?—Certainly. Railways are taking more labouring people to Calcutta, and the opening of the steamers has played an important part in respect of the condition of the people.

18. Q. When did the steamers begin about here?—It was about the time when the irrigation works were also opened.

19. Q. I remember the steamers running from Chandbally, 24 years ago, in 1878?—I think it was opened much before that.

20. Q. Don't you think that the railway coming in here helps to bring produce into the country and keeps the prices down?—Yes.

21. Q. Supposing there were no canals in Orissa and that there was merely a railway and these steamers, do you think you could have a famine there then?—I think so. About 200,000 acres of crops are protected by irrigation; the loss of crops in these 200,000 acres would be very large.

22. Q. Do you think here that the people are ready to take leases?—They are not always very ready to take leases; they are very ready in years of drought.

23. Q. Are they allowed to irrigate without leases, or are they obliged to have leases?—They are not allowed to irrigate without leases.

24. Q. They cannot pay for just one season?—They are not allowed now at the usual rates. That is my impression.

25. Q. And do you think if there was much more water that there would be a greater extension of irrigation?—That depends on the level of the water. Of course high lands cannot be irrigated.

26. Q. Supposing there were more canals, would they use all the water you could give them?—I think that would be the case.

27. Q. There is no well irrigation, I understand?—No. The people are very much prejudiced against well irrigation. They say well water injures the paddy crop. Rice is practically the only crop irrigated here.

28. Q. I saw coming along the railway patches of sugarcane cultivation. Is that not irrigated at all?—Sugarcane depends entirely on irrigation, but the area under sugarcane irrigated from Government canals is very small. It is chiefly irrigated from private sources.

29. Q. And what are these private sources?—The bunding up of small water-courses, the raising of water from river-beds, and so on.

30. Q. Tanks?—Sometimes also from tanks. Tanks are very much used for irrigating rice when the rain fails in September or October.

31. Q. But they must be very soon exhausted?—They are very soon exhausted, so the area they can protect in that way is very small. I don't think they can protect in that way more than two annas of the crop.

32. Q. Is there much use made of the boats, or of navigation on the canals?—Not much. The chief means of transport in Orissa are pack bullocks.

33. Q. Then there are roads always?—Yes.

34. Q. Is that throughout the whole of Orissa?—In Cuttack and Balasore I find that is the case, and even when they can get canal water to put boats on, they very seldom use the boats.

35. Q. What is the reason for that?—This is a province in which boats are very little used.

36. Q. These large rivers get boats on them; don't they?—Not many.

37. Q. It must be cheaper to use boats?—On the whole it is cheaper, but in the rivers they cannot use the boats throughout the year. The currents become too strong during the floods, while in dry weather the rivers dry up.

38. Q. Then, you don't think the canals are very much good for navigation?—Not much good at present. I don't think the people will take very much to navigation.

39. Q. Do the agriculturists take *takavi* advances for any purposes in this province?—They generally take loans for paying the revenue, especially at this *kist* in November.

40. Q. That is not from Government?—No.

41. Q. Do they get *takavi* advances from the Collectors?—Very seldom.

42. Q. It would be cheaper to get it from the Collectors than from the *bania*; would it not?—They don't like taking loans from Government, because the dates of payment are very exact.

43. Q. And they have got to pay them?—Yes.

44. Q. (*Sir Thomas Higham*).—You were on the settlement of which districts?—Cuttack District.

45. Q. Only P—Yes.

46. Q. That included the canal area and the rice district?—Yes.

47. Q. How much of the land here is under permanent settlement and how much under temporary settlement? What is the proportion?—I can give it from the Settlement Report. (Referring to it.) The total area of the district is 3,668 square miles, of which 1,454 square miles are permanently settled.

48. Q. That is one-fifth?—A little over one-third.

49. Q. The rest is all temporarily settled. Is this permanent area in the canal area?—There is a very small canal area. I don't think the area irrigated from the canals exceeds 20,000 acres in the permanent settled estates.

50. Q. On the temporarily settled areas will the assessment be enhanced now? Has any enhancement been proposed in consequence of the canals?—There are some rents which are not enhanceable during the currency of the settlement. The rents of occupancy *raiyats* cannot be enhanced until 15 years after the date of the settlement, but there are some rents which cannot be enhanced at all during the currency of the settlement; they have been fixed for the settlement.

51. Q. In the temporarily settled lands is there any enhancement of assessment proposed in consequence of canal advantages?—We did not take irrigation as a basis for enhancement.

52. Q. Has not the irrigation improved the value of the land at all?—Yes, it has certainly.

53. Q. The irrigated lands are sure of water during drought?—Yes.

54. Q. They are protected to a certain extent from floods?—Yes.

55. Q. And they can carry away their produce by boats?—The distributaries are not navigable.

56. Q. But they can carry their grain down to the main channels and send it away; cannot they?—But they don't use boats for carrying produce.

57. Q. How do they carry the grain then?—Either by carts or by bullocks.

58. Q. Then the canal has been very little used for that?—Very little used. It is scarcely ever used for carrying grain.

59. Q. (*Mr. Muir-Mackenzie*).—I gather that the area that can be benefited by the canal does not exceed 300,000 acres?—Yes, and that is only about one-fourth of the cropped area of the district. The cropped area of the district is about 1,300,000 acres.

60. Q. What do you think ought to be done for the remaining $\frac{3}{4}$ of the district?—Of the remaining $\frac{3}{4}$ there are certain tracts which are now exposed to very severe floods. I think there should be a complete examination of these tracts, and there should be a report by the experts as to what should be done for protecting these areas from floods. There may be irrigation if there be sufficient sluices in the embankments, but the most important thing is protection from floods. Of course after the construction of these flood embankments the irrigation works should also be extended as much as possible.

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61. Q. But the first thing they seem to want more urgently than even irrigation is protection from floods?—Yes.

62. Q. In the meantime is there anything less ambitious that can be done; do you think?—I think there may be extension of private works—tanks.

63. Q. Are there many tanks in any part of the district?—Not many, but even those which do exist are getting silted up.

64. Q. Do you think people could be induced to repair or improve their tanks if they were given advances from Government?—They are very apathetic. I don't think they will do anything themselves.

65. Q. You don't think they can be stimulated to do anything?—That may be tried.

66. Q. (Mr. Rajaratna Mudaliar.)—You said that the irrigational advantages were not taken into consideration in fixing your rents?—Yes.

67. Q. Why?—We generally left the existing rents of ordinary occupancy *raiyats* as they were, because we considered the existing rents to be fairly high. In the case of certain tenants, however, who paid very low rents, we enhanced on other grounds. Our object in the case of low rents for ordinary occupancy holdings was to bring them up to the level of the existing "competition" rents.

68. Q. What do you mean by "competition" rents?—That is the rents paid by ordinary occupancy *raiyats*, not the privileged *raiyats*.

69. Q. Is the proportion of privileged *raiyats* very high?—Not very high; it is rather low. Here there are some resumed *lakarajdars* (revenue-free-holders) and some *korida jamabundidars* (privileged tenure-holders paying low rents) whose rents are not liable to any enhancement during the term of settlement—30 years.

70. Q. In the case of occupancy tenants you can raise the rents at the end of 15 years?—Yes.

71. Q. Before the expiration of 15 years, supposing Government constructs a new canal, you cannot raise the rent?—I don't think there can be any enhancement within 15 years.

72. Q. I suppose you impose a water-rate?—On what?

73. Q. On these lands for irrigation supplied. Don't you do that?—Water-rates are levied by the Public Works Department for water supplied by that department.

74. Q. And your rents are irrespective of the water-rate?—Quite independent of the water-rate.

75. Q. In your settlements do you record any condition as to the duty of the zamindars to keep their private tanks in repair?—There is nothing about the preservation of tanks for irrigation in the *kabulyats* taken from the zamindars.

76. Q. If they neglect the works of irrigation, the tenants have no remedy against them, I suppose?—Nothing by contract.

77. Q. When was the settlement last revised in Cuttack?—The former settlement expired in 1301 *A.M.H.*, and the present settlement took effect from the following year.

78. Q. What was the increase as compared with former settlements?—A little over 50 per cent. for the whole province.

79. Q. For Cuttack?—It was a little more than that about 54 per cent. The exact figures are contained in the Settlement Report. In Cuttack it was a little higher and in Puri a little lower.

80. Q. Is there much scope for constructing tanks?—By the tenants themselves?

81. Q. Either by the tenants or by the zamindars?—I don't think either the tenants or the zamindars will construct many tanks of their own motion.

82. Q. Is there scope for any Government action being taken?—The District Board might construct tanks; a few every year.

83. Q. But the District Boards have no funds?—The question of funds is the difficulty.

84. Q. Would it not be worth the while of Government to take up the construction of these tanks?—By levying a cess?

85. Q. Yes?—But a cess will be very unpopular.

86. Q. But if the cess be very small?—I don't think the people will object if they see a few tanks constructed every year.

87. Q. (Mr. Allen.)—Did you make any enquiry about the difference in the rates of rents in irrigated and unirrigated areas?—We did make enquiries, but we could not find out exactly, because in almost every holding there are both irrigated and unirrigated areas, and the rents are often fixed in a lump for the entire holding.

88. Q. You were not able to trace any difference in the rates of rents?—We could not get papers from which we could trace this. I was sent to Dera Bira to enquire about the effect of irrigation on rent rates, and I could not get any reliable papers from the landlords from which I could prove that the rates on lands irrigated from canal water are higher than the rates on lands not irrigated.

89. Q. But the canals were not made at the previous settlement; were they?—No.

90. Q. Then you compared the rates with the previous rates on both irrigated and unirrigated lands?—On temporarily settled estates.

91. Q. Temporarily settled estates are what I am speaking about. What was the result of your comparison?—I here has been an increase everywhere.

92. Q. I don't think you quite understand me. One was irrigated and the other was unirrigated land and you compared the rates on both. What was the result? Did you find a larger rise in the irrigated tract?—No appreciable difference was found.

93. Q. Then, as regards the work of collection, did you find any difference?—That is the case everywhere.

94. Q. What did you find?—Collections are much better in irrigated areas than in unirrigated areas, I think. The estimate of the Settlement Officer was 5 to 10 per cent. better. That is the benefit derived by the zamindars.

95. Q. Do you know the Bhandi estate?—No, I don't know anything about the Bhandi estate.

Witness No. 78.—Mr. M. H. ARNOTT, Executive Engineer, Mahanaddi Division.

Mr. M. H.
Arnott.
11 Nov. 02.

1. Q. (The President.)—You are Executive Engineer in this Division, I understand?—Yes.

2. Q. What does that comprise?—Irrigation and embankments in the Cuttack District Buildings in Cuttack and Puri district roads and embankments in the Puri District.

3. Q. Is the feeling of the people more towards been 10 years in Orissa and 8 years in this Division.

4. Q. Were you here during the scarcity in 1896-97?—No. I was in England. I took over charge on the 12th of November 1896 and the whole thing was then over.

5. Q. Was not distress going on when you came?—Yes, in the districts, but there was no scarcity in the irrigated tracts.

6. Q. Is the feeling of the people more towards leases and settling down to irrigation every year, or do they still dislike it?—The tracts that are commanded by our distributaries may be divided into two; in the old established ones they take leases at once, that is, as soon as they lapse; on the Tal-danda there is no trouble whatever, but there are some new distributaries in which the leases lapsed last year

and there the people have not come in so well. (Position of new distributaries explained on map.)

7. Q. (Sir Thomas Higham.)—Do they go in for a season lease?—No; a ten-year lease. On the old distributaries they see the advantage of having the water and come in at once; on the new ones they sometimes hang back for the rain.

8. Q. In these tracts on the Mahanaddi Canal are the distributaries completed?—All the main distributaries are completed; we are also making minors to facilitate irrigation.

9. Q. Do you take up land regularly?—Yes; sometimes the zamindars give land willingly.

10. Q. Are these maintained by the Public Works Department?—Yes, the land remains the property of Government as long as the distributaries are used to convey water; if they are abandoned, the land is returned.

11. Q. Have you made any village channels?—These are village channels, but are called minors.

12. Q. You go about a great deal, I suppose?—Yes, I am on tour 15 to 20 days in each month about.

13. Q. Do you think with the existing channels and distributaries there is any extension of irrigation possible. You have 200,000 acres in Orissa; do you suppose if there was another rainless season you could double that?—It depends upon whether you have rain in the water-shed; if not these rivers will be dry; unless there is rain in the water-shed of the Mahanaddi, there will be no water down here except what would be drained in by local rain.
14. Q. Has there been a failure of flood in the Mahanadi?—No.
15. Q. Assuming there is enough water to fill the existing canals and distributaries, is it possible to increase the amount?—I think we are pretty nearly worked up to the full amount; as a rule, with even the ordinary rainfall, no extension is possible; you might do it in a dry year; there are places where you might increase irrigation once in 5 or 6 years.
16. Q. With the existing canals carrying the discharge they are capable of carrying now; could you with the addition of distributaries give material aid?—Certainly not in my Division; we are pretty nearly worked up to.
17. Q. In the Division could irrigation be largely increased in a year of extreme drought?—No, only in isolated places.
18. Q. How much of the square mile is practically irrigated during high demand?—The whole thing is under water; the only portions left out are homestead lands and high lands; high lands because they are not capable of being irrigated and homestead lands are not irrigated.
19. Q. What duty do they get out of the water?—It is a matter of soil; it runs to 80 or 90 and in sandy soil it comes down to 40; they grow a good deal of rice on sandy soil.
20. Q. I suppose in a season of drought the duty rises?—Yes.
21. Q. Are these duties at the head or outlet?—At the outlet; 65 at the head sluice is assumed.
22. Q. Do you think irrigation is better managed on the Sone than here?—Very much, I think. On the Sone you have distributaries and water channels and the water is better economised; here you sometimes fill up a tank or low land and when filled up irrigation goes on, this means a great waste in water.
23. Q. Would you advocate extension of village channels for the sake of having more economical irrigation?—No, because down here, if you have a fairly seasonable rainfall, you have as much water as you require; the area is full of distributaries and minors; I would say give them water if you have it; there is no more land to practically come under irrigation, so the conservation of the water for the purpose of considerable extension is.
24. Q. Do your canals carry many boats?—No; navigation is small.
25. Q. Do you keep any register of boats traffic?—Yes.
26. Q. Is the charge high for boats?—No.
27. Q. Would there be more boats if it was lower? No. I don't think so.
28. Q. There must be a great deal of rice exported in ordinary years?—Yes, a great deal goes by road too.
29. Q. I suppose the railway takes a good deal?—When it reaches Cuttack.
30. Q. Are there 500 to 600 boats going about; do you think?—Nor in my canals: last year the navigation receipts were about Rs. 15,000.
31. Q. About how many boats does that represent? I could not say without looking at the figures.
32. Q. Is there any scheme you would like to see carried out?—I think there could be a weir across the Surua river; that would only be for drought, as that is a tract that has suffered during drought (explained on map).
33. Q. What would it come to?—Rs. 30,000 to Rs. 40,000.
34. Q. Generally speaking, as far as the construction of works is concerned, you are finished?—Yes.
35. Q. Who looks after measurements now?—The zilladar prepares the *khassara* and measurements are checked by the Sub-divisional Officer. There is the cadastral map on which is shown classifications of land: (1) homestead; (2) Jalpat land at 8 annas; this requires water during drought, but, as a rule, does not need it; (3) high lands; these are lands that never require water; (4) lands irrigable at Rs. 1-12.
36. Q. Have you Revenue Superintendents?—No.
37. Q. Measurements are made for the sake of the classification?—Yes.
38. Q. Once the land is put down "jalpat," it is the same every year; is it not?—Yes.
39. Q. I don't see, except for statistical purposes, why you measure up at all?—We do not.
40. Q. If a man takes a 10-year lease of 100 acres, it is the same to you whether he irrigates 1,000 or 100?—We must know the area of his field.
41. Q. Does he not contract for a round sum?—No; it is Rs. 1-12 per *bigha*, once a *khassara* is prepared for a lease measurement, it runs for 10 years. After its expiry the classification that takes place is really only for the purpose of seeing whether we have made a mistake in the last *khassara*.
42. Q. Once the lease is finished this classification is very short?—Yes; a detailed classification is made afterwards.
43. Q. How are collections made?—By the zilladar with his amins.
44. Q. (Sir Thomas Higham.)—The *khassaras* are made out when you get an application for a lease; they are not annual?—When we get an application for a long lease; we have no annual lease.
45. Q. There are 4 classes of land; do they ever include 3rd class in the application the land that never required water?—No; the application is a general one and the applicants generally in it understate the proper area of irrigable land; high lands are voted during the time of classification.
46. Q. How do you determine the classification of these lands?—High lands are easily told; jalpat and homestead are open to fraud perhaps, so it is always advisable that the Sub-divisional Officer should check the statements.
47. Q. Have you any record of changes which occur during a lease?—We keep a record of any changes in the classification we have made.
48. Q. Supposing you have classified land that requires water every year, and, as a matter of fact, they don't take water, and they claim that you should put it in a lower class, have you any record of that fact?—In a crisis I make my patrols go round and get signatures of the villages irrigated as happened in October this year; if you don't get water from the 14th to the 25th, there is a sharp demand for water.
49. Q. Supposing they have no water at all, would that effect the classification?—No, I would be inclined to let them off.
50. Q. Your leases run for 10 years?—We have a system of blocks in villages in a well-defined area and we desire to arrange that these should lapse together.
51. Q. Is there any advantage in that?—It tends to prevent illicit irrigation.
52. Q. Have Civil Officers anything to do with the classification?—No.
53. Q. It is entirely in your hands?—Yes.
54. Q. Has it always been so?—Since 1892. Mr. Odling altered the system and it was taken away from the Revenue Superintendent, that post being abolished.
55. Q. (The President.)—Your system is very much the same as on the Sone canals?—Yes.
56. Q. The footing of the Revenue officers and members is very good?—Yes; we help each other as much as possible. If the Special Deputy wants patrols for collection purposes, we give them if we possibly can.
57. Q. (Sir Thomas Higham.)—Is there any appeal from the order of a Canal Officer to the District Officer?—Yes, in cases of assessment on one point; that is, if an annual rate is charged instead of a lease rate.
58. Q. You have some sugarcane cultivation?—Very little.
59. Q. Do you charge special rates?—Yes, because it wants more waterings in the hot weather.
60. Q. What is the rate?—I think it was raised to Rs. 5 an acre lately. I am not sure.
61. Q. Supposing it is Rs. 5, if a man pays Rs. 1-8 on his 10-year lease, he pays Rs. 1-8 on every field that is entered?—Yes.
62. Q. If he puts down sugarcane, does he pay Rs. 5 in addition?—Yes, because there the 5-year lease runs from June to November only.
63. Q. Do you charge anything for *rabi* crops?—No.

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64. Q.—Sugarcane is the only thing that pays an extra rate?—Yes, and *dilwa*.

65. Q. Are there any garden crops?—I have no *abi* in my Division.

66. Q. Mr. Inglis' book (page 45) shows that the area commanded by the present system of distributaries on the Taldanda and Machgong canal systems is 167,301 acres. Could you get water on the whole of the area from your distributaries?—No, I don't think so.

67. Q. How much do you irrigate?—55,000 acres to 60,000 acres.

68. Q. What is meant by saying 167,000 acres is commanded?—I take it that area supplied with canals and distributaries.

69. Q. Could you get water on every acre of that?—No; nothing like it.

70. Q. Is the ground too high?—Yes, and there are village sites.

71. Q. I am not speaking of whether they want water; could you get water there?—You would have to lift it.

72. Q. Is there much high land?—Yes.

73. Q. Whereabouts?—In each individual village; for the whole of the irrigable area it comes to one-half; then there are tanks and low-lying lands and streams and drainages.

74. Q. Mr. Inglis' report (page 45) shows that the area found by enquiry to be suitable for irrigation on these canal systems is 60,631 acres?—Yes, that may be taken as fairly accurate.

75. Q. Is 66,000 the maximum that will take water?—Yes; I have irrigated up to 67,000.

76. Q. Have you got plenty of water up to 60,000?—It depends on the river; this year I put in 1,300 cubic feet which I never did before; it is only designed for 1,100.

77. Q. Practically there is no difficulty in irrigating all the land that requires water?—No; if the river is favourable, it also depends on the state of the Taldanda Canal.

78. Q. Have you ever had difficulty in maturing all the land that requires water?—No; there have been no complaints. You don't want to extend distributaries?—Only in local cases and a few minors; in certain places they are keen to have minors.

79. Q. Do you make them?—Yes.

80. Q. Are these canals navigable?—The Taldanda is navigable for its entire length; the Machgong is navigable for 5 miles only.

81. Q. Is there much traffic?—Very little.

82. Q. Has there ever been any?—In the old days there was a little.

83. Q. Is grain carried?—No, I made observations in 1893 on the Machgong and found that it would not pay to make locks on the Machgong; the amount of rice sent west is not sufficient to give us a paying traffic.

84. Q. One of the witnesses said that the canals are not used for carrying grain, but only for passengers?—Yes.

85. Q. Do they carry grain by carts?—Yes; they take it up to Ragonathpur which is a collecting centre.

86. Q. Why don't they carry it up by canal?—I don't know. Sometimes boats meet a steamer bound for False Point and which then goes to Mauritius, but that is only for a short while.

87. Q. They don't export much rice?—No; a proposal is that there shall be sluices for letting water on to the land. Some of the sluices are made as a contribution work. People contribute half and Government half; no charge is made for irrigation; no cess is levied; works are maintained by Government; these works are a separate charge and not against the Orissa canals, but some protective embankments are charged against the canals; in some cases the canal is a protective embankment; the left bank of the Taldanda Canal acts as an embankment; in the great level were raised; we never let it breach and never let flood of 1890 all places which were below high flood it go below 4 feet (all the above remarks were made while examining maps.)

88. Q. (Mr. Muir-Mackenzie.)—What are the agricultural embankments that you allude to?—They are purely for protecting village sites and agricultural lands; they are useful in protecting tracts that would otherwise be thrown out of cultivation.

89. Q. (Mr. Rajaratna Mudaliar.)—You are in charge of the Mahanaddi Division?—Yes.

90. Q. What is the area irrigated in that division?—About 55,000 acres are under lease.

91. Q. Out of nearly 200,000?—Yes.

92. Q. What is the size of your blocks?—It varies according to the natural configuration of the country.

93. Q. By this system of blocks that you explained you render illicit irrigation impossible?—We endeavour to do so.

94. Q. Does the block include lands liable to different rates?—Yes.

95. Q. In such cases your only safeguard against fraud in classification is inspection?—Yes.

96. Q. During a 10-year period could you make alterations in the classification?—Yes.

97. Q. (Mr. Muir-Mackenzie.)—Has that ever happened?—It has happened on the expiry of a lease that a large area of ordinary land classed as *jajpat* has been found to be irrigable that should have been assessed 1-12.

98. Q. (Mr. Rajaratna Mudaliar.)—What is the revenue on 55,000 acres?—I cannot tell you; I have nothing to do with it. It is a matter of calculation.

99. Q. You don't know the cost of the revenue staff?—No.

100. Q. Is any large area benefited by percolation?—No.

101. Q. In Orissa the amount is said to be 60,000 acres?—It is not very large in my Division.

102. Q. You said in your Division there is no scope for extending irrigation?—No; the whole area is practically commanded.

103. Q. Suppose in drawing up a lease for the whole block one or two men refuse to join, would there be any difficulty?—Yes, there would. I would make the lease unless the area of the non-signatories exceeds 5 per cent.

104. Q. (Mr. Allen.)—Do you know the Khurda Government estate in Puri?—Yes.

105. Q. There is no irrigation there?—No; Government irrigation; they have Improvement Fund irrigation.

106. Q. What does irrigation consist of?—Small reservoirs and they bund up natural drainage channels.

107. Q. Does the Khurda estate cover the whole of a sub-division?—Yes.

108. Q. The occupied area is 251,000 acres?—Yes. [Extract from page 7 beginning "Dagavati" of some paper read out; name of paper not stated.]

109. Q. Do you think there is much scope for petty irrigation there?—Looking at the country I think there is.

110. Q. I have a list of small works prepared by Mr. Taylor, Settlement Officer (last shown). What is your opinion of these?—I don't know any of these.

111. Q. From what you know you think a good deal might be done in the way of tanks and bunds for petty irrigation?—Yes; it should be done under supervision.

112. Q. Do you know the Banki Government estate?—No.

113. Q. (The President.)—Have you ever found it necessary to improve the natural drainage outfalls to relieve rice lands to prevent water-logging?—Yes.

114. Q. Is injury being done by water-logging?—Certainly in this part (map).

115. Q. My experience in Egypt was that it was as necessary to have drainages to take water off as it was to have canals to bring it on?—Yes, unless you drain you cannot have much irrigation. Between every two distributaries we have a drain; they are called MacMillan's drains.

116. Q. You recognize the necessity for drainage?—Yes, especially here.

117. Q. As regards classification, supposing you had one rate for the whole village, fixed at some intermediate figure between your highest rate of Rs. 1-12 and the lowest of 8 annas, would that not tend towards simplification?—The man who paid 8 annas would not like it at all.

118. Q. Has that distinction been from the very first?—Yes; it is peculiar to Orissa.

119. Q. (Mr. Rajaratna Mudaliar.)—In the case of the Babu who made a tank, were any concessions granted to him?—I cannot say.

120. Q. What rate do you charge for irrigation by lift from the canal?—They are annual rates.

121. Q. Is there much lift irrigation?—No, very little.

WITNESS No. 79.—Mr. C. A. WHITE, Superintending Engineer, Orissa Circle.

Mr. C. A.
White.

(Replies to printed questions.)

Read Government of Bengal, Irrigation Department, letter No. 14681 of 10th December 1901, to C. A. White, Esq., Executive Engineer, enclosing copy of letter No. 111, dated 14th November 1901, from the Secretary, Irrigation Commission, to the Secretary to the Government of Bengal, Revenue Department.

being done, the lands for irrigation should be divided into large blocks of several villages, all of whose leases will lapse at the same time.

The periods for the blocks should be arranged, so that about one-fifth of the leases will lapse each year, five years' leases being granted.

11 Nov. 02.

A.—GENERAL.

1. The answers 2-11 refer to tracts irrigated by the Midnapore Canals.

I have been in charge of these canals for nearly three years. I have availed myself of the office records and also of the experience of Babu Ram Sudan Bhattacharjee, Special Deputy Collector, who has been in charge of the Revenue Branch of the Midnapore Canal Department for five years.

The answers 12-22 refer to tracts on the borders of the Midnapore and Hooghly districts, where *rabi* and hot-weather crops are irrigated from temporary dams thrown across the tributaries of the Rupnarain river. I have had three years' personal experience of this irrigation, and have availed myself of the experience of Babu Ramanath Sircar, Supervisor, who has been in direct charge of these works for eight years, and previously had 25 years' experience of the Midnapore Canals.

2. Average rainfall of the last 20 years, Midnapore, Luchmapore, Mowah, Panchecoorah :—

	Inches.
January	0.43
February	1.03
March	0.97
April	1.50
May	5.16
June	10.17
July	11.25
August	12.33
September	8.69
October	3.34
November	0.44
December	0.14
Total	55.60

3. (1) No.

(2) No.

(3) No. On the other hand, in some cases, rayats do not manure lands that will be irrigated by canal water, as the silt in the canal water makes excellent manure.

Refer to Chief Engineer's Revenue Report of 1880-81 and 1881-82; the same remarks still hold good.

(4) No. There is very little black cotton soil in the district.

(5) To some extent.

In dry years the supply in the Cossye river from which the canals are fed is precarious.

In 1883-84 rains practically stopped on 20th September. The available supply for October was about 500 c. ft. per second, which just irrigated 100,000 acres. The assistance of the police had to be obtained to keep the rayats in order.

In 1888-89, the average supply in November was 300 c. ft. per second, which just sufficed for the 66,000 acres leased.

In 1891-92, supply fell to an average of 600 c. ft. per second in October, and 84,000 acres were irrigated. Some 2,000 acres of leased area could not obtain water.

In 1892-93, with an average supply of 700 c. ft. per second in October, 91,000 acres were irrigated, and gave excellent crops, but it was exceedingly difficult to make the supply suffice.

In 1895-96, Tatil was introduced to irrigate 65,000 acres with an average supply of 700 c. ft. per second in October.

In 1896-97, a supply of 400 c. ft. per second only was available in October for 65,000 acres. However, Mr. Barlow, by his personal energy, effected the irrigation satisfactorily with the assistance of the police.

In 1898, Government restricted the area for long lease to 75,000 acres. However, I am of opinion that with due care, the leased area can gradually be increased to 100,000 acres, which would practically include all the lands that could ever require water. (See reply to question 6 below.)

The water should be forced on the rayats in good time in September, to prevent any rush in October, and, as is now

(6) No.

(7) No.

(8) No.

(9) No further demand. (See reply to question 6 below.)

4. No such cases in the district.

5. Generally not, but in Chief Engineer's Revenue Report of 1879-80, page 13, when rainfall was very scanty (38.11 Midnapore for the year), it is noted that some persons migrated from unirrigable tracts to irrigable tracts, also that in leasing out Pargana Dhakibazar and Bhunj-bhoom in patnee, the former, which was irrigable from the canals, was greedily sought after, but for the latter, which was not irrigable, there was but little demand; it was also noted that for irrigable lands, jotedaree rights were sold, which was never done before for other lands.

6. Excepting for about 50,000 or 60,000 acres of higher lands, there is no real demand of canal water for irrigating the 100,000 acres culturable, commanded by the canals. Leases are taken for other lands, for the sake of the silt in the water, as an insurance against the years of drought, and to save the rayats the trouble of storing rain water.

The average area irrigated since the canals were in full working order in 1874-75 is 73,420 acres, the maximum for any one year being 104,149 acres in 1881-82. In 1900-1901 the leased area was 80,000 acres. Of this 80,000 acres about half lies between reduced levels of 60 and 20 feet above mean sea level, one quarter between 20 and 15 feet above mean sea level, and the remaining quarter between 15 and 8 feet above mean sea level.

I question if any lands below the reduced level of 15 feet benefit from irrigation, excepting in years of extreme drought like—

1879-80

1883-84, and

1892-93.

Both in 1894-95 and in 1899-1900, some leased lands never took water at all, as they suffered rather from excessive rain water.

In the Sone the total depth of water on the rice-fields required to raise the rice crops, taken over a number of years is :—

Rain	2.80
Canal water	2.70
	5.50 feet

Whereas in Midnapore it is :—

Rain	3.00
Canal water	1.30
	4.30 feet.

The canal water being taken in three waterings of 5 inches average. The climate of Midnapore district is more humid than that of the Sone: the rice crops are about 90 per cent. broadcast, and there is no "Nigar" (drying of the fields in September before the final watering). A single watering may safely be spread over five weeks, whereas in the Sone it must be done in about three weeks.

7. (1) No second crop is grown. If the *aman* (*khari*) rice crop is flooded out, *boro* rice (hot-weather crop) may be planted, and irrigated for an area of 1,000 to 4,000 acres, but the supply of canal water for the final watering in April is doubtful.

(2) *Anan* (*khari*) rice is invariably grown whenever water for irrigation is available.

This crop is easy to grow, and very productive, and the Uriya-Bengali rayat found in Midnapore district is even lazier than the Uriya rayat in Orissa, who, though he will not take the trouble to transplant much of his rice, does what he calls "buisan," i.e., he lets the cattle graze the rice down, when the plants are 9" to 1' high, he then ploughs it up, in 3" of water, and roughly re-arranges it afterwards by hand. The Midnapore rayat is generally content with broadcast rice.

Mr. C. A
White.

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(3) The table below shows the increase due to irrigation, as gathered from a large number of crop experiments.

These experiments are not very reliable, more especially as they take no note of the wholesale loss of unirrigated crops in dry years, but they will give an approximate estimate. No experiments were taken from 1895 to 1898 of unirrigated crops.

(a) Years of ample rainfall:—

YEAR.	NUMBER OF EXPERIMENTS.		OUTPUT OF PADDY PER ACRE.		Rain-fall, July to October.	REMARKS.
	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.		
1	2	3	4	5	6	7
1880-81 . . .	2,234	599	21 74	18 93	34 24	Seasonable.
1881-82 . . .					49 82	
1884-85 . . .					37 48	
1898-99 . . .					34 85	
1899-1900 . . .					42 28	
1900-1901 . . .					45 92	

In 1880-81, 415 crop experiments were taken of unirrigated crops of Hidgitlce, the best rice lands of the district, which lie between reduced levels of 15'00 and 8'00 above mean sea level. The result gave 23'15 maunds paddy per acre, and 44'34 maunds straw.

That year's crop experiments on lands near the canal being—

			Mds.
Irrigated . . .	{	Paddy . . .	23'30
		Straw . . .	69'00
Unirrigated . . .	{	Paddy . . .	20'47
		Straw . . .	54'00

See the analysis of crop experiments for the years 1873 to 1880 given in Superintending Engineer, South-Western Circle's Revenue Report of 1880-81.

(b) Years of scanty rainfall:—

YEAR.	NUMBER OF EXPERIMENTS.		OUTPUT.		Rain-fall.	REMARKS.
	Irrigated.	Unirrigated.	Irrigated.	Unirrigated.		
1	2	3	4	5	6	7
1882-83 . . .	978	304	20 28	17'01	35'01	Seasonable.
1897-98 . . .					29 09	

(c) Years of drought:—

1879 60 : : 1883 84 : :	} 1914	422	21 13	9 52	{ 21 83 29 24	Rains stopped practically on 20th Septem- ber 1893.
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In 1892-93 rain was very short in August, September, October, but in spite of a short supply of canal water, the water being judiciously distributed, the irrigated crops were magnificent, whilst all others, except on low lands, were a complete failure.

8. (1) An increase of 20 per cent. Rs. 50 per acre instead of Rs. 42 with 21 maunds paddy, 50 maunds straw for irrigated lands, against 18 maunds paddy and 40 maunds straw for unirrigated lands taking paddy at 20 seets for the rupee and straw at annas 2-6 per maund.

(2) An increase of 100 per cent., Rs. 60 per acre instead of Rs. 30 allowing for increased market rate.

9. (1) Owner, nil.

Cultivator Rs. 1-8 for long leases, annual leases at Rs. 3 are rarely if ever taken, and very few occasional waterings at 8 annas.

There is no *rabi* or hot-weather irrigation, excepting *boro* rice (occasionally) at Rs. 3 an acre.

(2) Nil.

(3) Nil.

Water-rate is paid on the whole leased area, whether irrigated or not, provided water was available when required. Only irrigable lands are leased.

10. Nil. It was tried to induce villagers to construct their own village channel, but they would not do so. The present system of irrigating from field to field suffices.

11. No. The silt in the water acts as good manure. Some of the low lands are damaged by floods, and on account of imperfect drainage of rain water.

The result of crop experiments on the same field irrigated for a period of five years in village Raghunathpore gives the following results:—

Year.	Area 1/4th acre.		Per acre.	
	Mds.	Srs. Ch.	Mds.	Srs.
1896-1897 . . .	1	26 0	=	13 8
1897-1898 . . .	1	35 0	=	16 0
1898-1899 . . .	1	36 8	=	15 12
1899-1900 . . .	2	30 0	=	22 0
1900-1901 . . .	2	38 14	=	23 31

On three other plots for 1/4th acre we get for four years totals of:—

Year.	Mds. Srs. Ch.		Per acre average.	
	Mds.	Srs.	Mds.	Srs.
1897-1898 . . .	5	34 1 1/2	=	15 2 1/2
1898-1899 . . .	4	23 9	=	12 9 1/2
1899-1900 . . .	7	28 6	=	20 2 1/2
1900-1901 . . .	7	2 12	=	18 3 1/2

* Damaged by grasshoppers.

These tend to show that the canal irrigation improves the lands. These fields were regularly manured with decomposed cowdung and ashes. Crops were sometimes broadcast, and sometimes transplanted.

My experience of the result of draining irrigated lands is that it gives the rayats more trouble in maintaining their field *bunds*. For the Midnapore Canals, drainage is not generally necessary excepting for excessive rainfall or floods, as the rayats do not "Nigar," and most of the crops are broadcast. In low lands if the crop once get started before the water is too deep, the crop is practically safe.

Many of the minor drainage cuts on Midnapore Canals are cross banded, and used as minor distributaries.

FOR "RABI" AND HOT-WEATHER CROPS FOR AN AREA OF ABOUT 5,000 ACRES ONLY.

12. (1) By temporary dams thrown across the beds of the river Sankar, a branch of the Darkesnar river, and across the beds of the Metala and Mohisanalla khals, branches of the Jhoomi, which also is a branch of the Darkesnar river.

(2) By small channels and from field to field, the water being taken, where necessary, through the public embankments by sluices or cuts; all lands are irrigated by flow except the sugarcane and vegetables, which are irrigated by lift.

(3) (a), (b) From January until the end of April.

(c) Whenever the rains stop, September, October, November or December, until the end of April. In this case, the first water would be used for *aman* (*khari*) rice crops.

13. (1) After the *aman* crops are reaped, *til* and sugarcane may be planted.

(2) The more valuable crops, *til* (an oil-seed) and sugarcane, are grown instead of poorer *rabi* crops as peas, mustard, etc., which do not require irrigation.

3 (a), (b), (c) They render a cold or hot-weather crop possible on lands flooded out during the rains. On such lands *boro* (a hot-weather rice) is transplanted with the last of the flood-water, and subsequently irrigated from the river *dams*.

14 (1) If *boro* and *til* are planted too late, there is danger of the crops not being ready before the rainy season sets in, when rain or hail-storms might damage them. Also the produce is diminished by late planting.

(2) Sugarcane will suffer, and there will be a lack of drinking-water.

15. No. *Til* crops require one watering only when sown; *boro* requires about three waterings.

16. (1) The lands may produce an *aman* rice crop, value Rs. 35 per acre, without irrigation. Then if water is available, on some of these rice lands a second crop of *til* will be grown worth Rs. 25 an acre.

(2) The *aman* crops, worth Rs. 35, might be almost lost and be worth only Rs. 10, whereas one irrigation in October might save the crop, and make it worth Rs. 35.

A *boro* crop, when water is available, is worth Rs. 22 an acre; it cannot be grown without irrigation.

17. (1), (2) Annas ten per acre is paid by the rayat to the zamindar who constructs the dam and clears the channels.

(3) Nil.

(4) Nil.

18. Very little except the rayat's manual labour. (See 20 below).

19. No.

20. Under favourable circumstances, the cost of the construction and removal of cross dam and for clearing the channels comes to annas four to six an acre, and is borne by the zamindar. The system works well and no legislation is required.

21. The rivers being embanked, permission for these dams has to be obtained annually from the Collector (the Superintendent of Embankments) under section 31 of Embankment Act, II of 1892.

When two or more dams are allowed on the same river to different zamindars, litigation between the zamindars often arises. It is a question whether Government should not take over the working of these dams to prevent such litigation and to ensure the dams being properly removed, which is very imperfectly done at present.

These dams should not be allowed within tidal limits, on account of the deterioration caused thereby to the rivers as drainage and navigable channels.

22. No.

Letter No. 4752, dated Cuttack, the 7th October 1902.

From—C. A. WHITE, Esq., Superintending Engineer, Orissa Circle,

To—The Chief Engineer, Bengal, Public Works Department.

I have the honour, in continuation of this office No. 4619 of 30th September 1902, to forward the replies asked for, for the Irrigation Commission.

I am indebted to Mr. Arnott for the interesting accounts of the Khurda estate works, and for much useful information about the various soils and crops.

Memorandum of points to be considered by the Irrigation Commission in Bengal.

IN DISTRICTS OR TRACTS LIABLE TO FAMINE OR SCARCITY.

Gross and cultivated or occupied areas of each district :—

District.	Total area.	Cultivated area.	Per cent.	
Balasore	1,200,000	566,000	58	Revenue Report, Form IVE. Mr. Maddox.
Cuttack	2,469,300	1,357,990		
Puri	1,274,790	746,799		

Average gross area annually under crop and the probable proportions of the cropped area which are irrigated by Government irrigation works, by private or village works and by wells respectively.

District.	Cultivated.	By Government canals, 1900-01.	By Government embankment sluices in dry years.	PRIVATE OR VILLAGE WORKS.		Wells.
				Zamindari sluices.	—	
Balasore	Acres.	32,753	600A. I.			
Cuttack	1,357,990	170,787	2,000A. I.			
Puri	746,799	—	71,970	500		

* Kujang circuit embankments.

(a) Zamindar.

(b) Khurda estate.

General configuration of the country.

Orissa is the delta formed by the rivers—

Mahanadi. | Salindi,
Brahmini. | Burabalong,
Baitarni. | Panchpam and
Subarnarekha.

It is bounded by the Subarnarekha on the north, the sea on the east, the Chilka Lake on the south, and the plateau on the west.

Its western side is composed of a range of low hills along the edge of the plateau.

These hills are chiefly composed of gneiss with occasional sand stone outcrops; a few outlying hills of a similar nature are dotted about the delta.

At the foot of the hills is a stratum of laterite ranging from very hard laterite rocks at Naraj to a muddy laterite gravel near Balasore.

The cultivated alluvial deltaic lands fall uniformly from a reduced level of 70 at the edge of the laterite to the sea level on the coast in a distance ranging from 15 to 45 miles.

The coast line in the Balasore district on the north consists of blue clay, Sunderban swamps merging into sand-dunes in Cuttack and Puri districts, with an inland fresh-water swamp; the Sur Lake north of Puri about 10 square miles area, and the large salt-water Chilka Lake south of Puri.

This lake has an area of 350 square miles with an average depth of 6 feet only.

The well wooded alluvial delta of lovely soil is intersected by the branches of the large rivers. These rivers cause very disastrous floods.

The face of the country is lined with large embankments constructed since times immemorial, without plan or system made with the object of protecting the country from the floods.

Character of the soils and their suitability for irrigation.

Land is divided into three classes according to their situation—

Jala or wet lands grown in rice.

Pât or river side lands, which receive deposits of silt (*patta*) suitable for tobacco, cotton, *rabi* crops, etc.

Kala (black) the highly manured lands about the homesteads grown in vegetables, etc.

The soils may be classed as follows :—

Matal { *Chikita*.—Strong sticky clay.
Chauria.—Hard clay cakes and cracks.
Kelooa.—Black clay retentive of moisture; cracks on drying; some salt in it.

Ruria or *Gangutia*.—Clay with kunker lime modules.

Kalia.—Clay and lime dust, retentive of moisture.

Raktimala.—Stiff rich soil.

Pankua.—Black mud without sand, found in tanks.

Patta.—Alluvial soil formed by silt deposit.

Panvia.—Loose futile soil.

Balia matal.—Rich sandy loam.

Dorasha.—Of sand and clay in equal parts, retentive of moisture.

Rangamati.—Red ferruginous sandy loams, near the laterite: a poor soil.

Telhalia.—Three sand to one of clay: a poor soil.

Shengajami.—Very poor sandy loam with little moisture.

Balia.—Poor sandy soil.

Bali.—Pure sand.

Nunajami.—Saline soil of little or no use for crops.

All the above soils are suitable for irrigation except the clays in low lands, which would not require water.

Extent to which cultivation is dependent on artificial irrigation.

Excepting on the higher lands and in years of drought cultivation is independent of artificial irrigation. In Puri district, about 13 per cent. of cultivated area may be irrigated through embankment sluices; in Cuttack district, about 14 per cent. only of the cultivated area is artificially irrigated by canals, etc.; and in Balasore about 6 per cent.

Statistics of annual and monthly rainfall.

The annual rainfall and monthly averages of 25 years are given. Information prior to 1877-78 is not available for all the stations.

Mr. C. A. White. The averages are—

11 Nov. 02.

		Inches.
April	.	10.7
May	.	4.39
June	.	8.77
July	.	11.52
August	.	12.04
September	.	9.99
October	.	5.66
November	.	1.95
December	.	0.31
January	.	0.29
February	.	0.22
March	.	1.09
Whole year	.	58.21

The names of the recording stations are—

- | | |
|-------------------|------------------|
| 1. Cuttack. | 7. Marsaghai. |
| 2. Narahe. | 8. Akhoyapada. |
| 3. Janapur. | 9. Jajpur. |
| 4. Kulmi. | 10. Bhadrak. |
| 5. Balia. | 11. Pipli. |
| 6. Jagatsinghpur. | 12. False Point. |
| | 13. Kendrapara. |

Previous annual rainfall for Cuttack only is also given—

1869-70	49.69
1870-71	51.49
1871-72	50.03
1872-73	73.01
1873-74	40.59
1874-75	84.86
1875-76	91.17
1876-77	43.92

Statement of average monthly rainfall of 13 stations.

Year.	Whole year.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
1877-78	43.22	3.17	5.10	8.40	8.75	8.09	5.44	3.45	0.01	0.06	0.16	0.02	0.56
1878-79	50.79	0.80	4.51	3.38	9.02	10.43	7.79	7.43	4.47	1.83	0.00	0.31	0.82
1879-80	50.79	0.60	4.11	3.00	9.92	14.36	13.89	3.92	0.25	1.66	0.00	1.23	0.21
1880-81	76.20	1.16	4.76	13.76	10.02	23.31	10.01	9.12	1.70	0.00	0.03	0.00	2.23
1881-82	56.89	1.50	2.25	10.57	15.89	11.63	9.18	4.60	0.13	0.41	0.38	0.11	0.24
1882-83	53.03	1.47	4.88	5.54	17.81	8.71	8.94	7.98	1.55	0.09	0.00	0.39	1.73
1883-84	57.18	0.52	2.29	16.40	13.03	9.69	9.77	1.78	0.16	1.53	0.09	1.58	0.35
1884-85	50.42	0.57	1.87	11.10	9.58	7.45	11.29	6.08	0.23	0.07	0.16	2.63	0.32
1885-86	51.49	0.91	4.41	4.05	10.63	10.14	10.08	4.54	1.26	1.20	0.39	0.05	3.13
1886-87	60.05	0.02	3.14	10.70	10.65	9.36	14.66	6.87	1.56	0.45	0.48	0.00	1.66
1887-88	47.79	1.25	7.23	6.02	11.67	8.18	6.12	2.69	0.87	0.00	1.70	1.26	0.14
1888-89	49.07	0.10	2.76	2.33	8.91	21.61	8.36	1.11	2.88	0.00	0.06	0.81	0.49
1889-90	67.95	0.34	2.62	11.58	13.10	13.11	5.30	9.16	11.24*	0.15	0.04	0.02	1.27
1890-91	63.17	0.23	3.16	9.28	12.59	7.58	14.40	8.63	1.91	0.05	0.00	0.99	4.30
1891-92	61.03	0.12	4.38	1.61	10.34	16.93	19.45	1.17	6.77	0.00	0.00	0.20	0.01
1892-93	56.43	0.43	1.55	10.42	12.31	8.20	7.77	0.29	0.93	0.00	1.85	1.24	2.85
1893-94	74.83	0.88	28.12	7.03	8.17	8.63	15.73	5.52	0.09	0.00	0.02	0.18	0.46
1894-95	53.91	1.20	0.97	13.77	16.34	9.59	6.79	6.37	3.07	0.03	0.02	0.60	0.16
1895-96	63.012	2.14	1.76	19.97	8.89	15.91	8.37	5.46	0.11	0.00	0.00	0.03	0.21
1896-97	65.86	0.40	3.52	15.58	13.93	15.03	9.12	0.02	0.03	0.00	0.01	2.87	4.45
1897-98	55.99	0.84	1.14	9.37	13.71	12.23	7.43	9.31	1.72	0.12	0.00	0.07	0.00
1898-99	53.37	1.80	2.72	6.81	9.34	13.14	8.70	10.68	0.00	0.18	0.06	0.37	0.08
1899-1900	54.50	4.72	7.23	8.70	9.10	9.54	4.69	9.67	0.00	0.08	0.00	0.40	0.45
1900-1901	76.85	1.23	2.71	6.56	13.30	22.27	15.03	6.93	0.03	0.01	1.75	2.61	0.37
1901-1902	46.91	0.91	2.71	3.40	10.95	9.02	8.25	3.34	7.57	0.00	0.17	0.00	0.56
Total	1,456.29	26.74	109.93	210.33	283.03	310.90	219.91	141.45	48.86	7.81	7.35	17.93	27.20
Average	58.21	1.07	4.30	8.77	11.52	12.44	9.99	5.66	1.95	0.31	0.29	0.72	1.09

* Cyclonic storm.

Years in which reliable records show that there has been (1) famine, and (2) severe scarcity not amounting to famine.

Authorities.—Captain Harris' report and Maddox's Settlement, and Famine Commission of 1866.

	Cause.	Remarks.
Early in 14th Century two famines between 1461 and 1478.	Probably drought.	* Rice over two seers per rupee.
Early in 18th Century. 1769-70.* 1774-75.		
1792-1793	...	Over 10 annas a seer (105 tolas). Seven lakhs revenue remitted.
1803-1804	...	Scarcity in Cuttack, but not in Balasore.
1806	...	Total failure of rains, 17th September to 16th November.
1807	Floods	Scarcity.
1809	...	Bad crops and great distress.
1817		
1824		
1831-32	Inundation of sea on Balasore coast.	Practically depopulated much lands.
1834-35	Flood.	
1836	Drought.	Comparable in severity with 1770. Rice 5 seers to Rs. 1; $\frac{1}{2}$ to $\frac{1}{4}$ of the population died.
1837		
1842		
1865-66	Drought aggravated by floods the following August.	Famine in Madras raised local prices and caused local distress.
1877-78	...	

	CAUSE.	REMARKS.
1889	Drought	Loss of crops and high prices.
1891	Drought and floods.	Scarcity at same time in Bengal and Bihar; rice 14 seers.
1894	High flood in July and August	Caused local distress; price of rice was high till <i>sarad</i> cut excellent crop.
1896	Flood followed by drought.	Seven to 8 annas crops; local distress, especially near Chilka Lake.

Staple crops for each main class of soil.

Stiffest clay.—Sarad.

Ordinary clay.—Sarad rice, biali, dalwa rice, rabi, sugarcane, kulti, and other rabi crops.

Loams.—Sarad rice, biali rice, sugarcane, rabi, vegetables, tobacco, jute, etc.

Kuntary soil and sandy.—Sarad biali rice and poorer rabi crops.

Saline lands.—A poor rice.

Times at which sown and reaped.

Crops.	Seed sown.	Transplanted.	Reaped.	REMARKS.
<i>Sarad</i> :	May	...	December.	
" broadcast	June	...	January	
" transplanted	July	...	February	
<i>Biali rice</i>	May	...	August, September	"Four per cent. whole rice.
<i>Dalwa</i> "	December	January, February	April.	
<i>Sugarcane</i>	...	January, March	January (following).	
<i>Rabi</i>	September, November	...	January, February	

What are the crops which require irrigation, and how many waterings do they require, and at what times of the year?

Sarad rice—

Four waterings required—

- (1) For ploughing in June, and sowing.
- (2) Sowing in July, August.
- (3) Intermediate.
- (4) When rice is going to flower in October.

Dalwa—

Must be kept always in water.
Water is especially required—

- (1) For planting in January.
- (2) When flowering in March.

Sugarcane—

Five waterings—

- (1) Ploughing in January.
- (2) Planting in February, March.
- (3) April.
- (4) May.
- (5) June.

Rabi—

Most rabi crops want one watering (or rain) when half grown.

Utility of irrigation in increasing the produce of the land and in securing it from the effects of a failure of the rainfall.

Mr. Maddox estimated in his Settlement Report (page 89) that the average outturn on an acre of irrigated land is 13½ maunds (1,110 lbs.), and on an acre of unirrigated land 12 maunds (980 lbs.), and that the difference (103 lbs.) was worth Rs. 3-4 calculated on the average price of rice for the last ten years of 18-23 seers to the rupee. To this, add the difference in straw 28 maunds on irrigated land against 22 or 23 maunds on unirrigated lands—making a total increase of Rs. 4 per acre on account of irrigation.

Mr. Inglis values it at Rs. 5 (five).

This estimate may be accepted.

The crop experiments taken by the Public Works Department point to Rs. 6-87 as the value of irrigation; but the

experiments are taken on small areas only and often the selection of the crops is not made with sufficient system.

Mr. Maddox in his same report (page 83) says:—

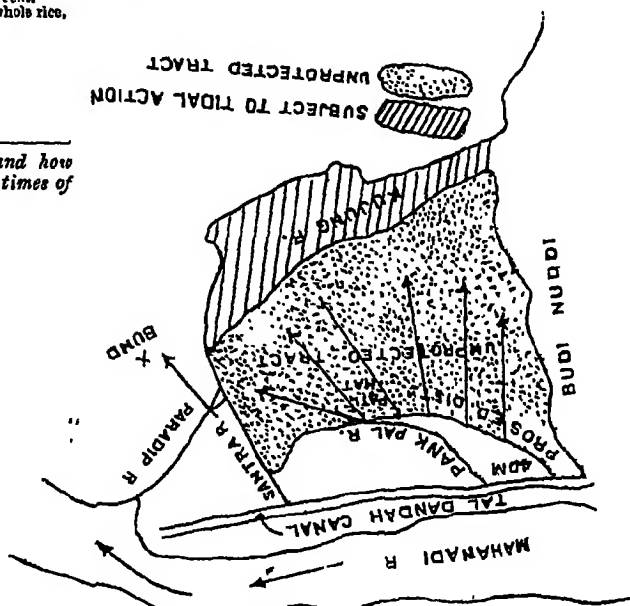
"Taking the minimum rainfall compatible with a successful harvest at 4 inches in October (paragraph 429 of Famine Commission Report of 1886), we find that in the thirty-nine years, from 1860 to 1898, the rainfall in October fell short of this amount fifteen times in Cuttack, twelve times in Balasore, and six times in Puri, or an average of eleven times in 39 years. We may assume roughly that once in four years a third of the crop will be killed by drought or Rs. 3 per acre per annum on an average."

General measures which should be adopted for extending irrigation in each district either by Government or private works.

Generally there is no necessity to extend irrigation in the Orissa district.

Encouragement might be given to the zamindars to make small reservoirs and irrigation drains at the foot of the hill for rice irrigation in October-November, and there are a few works affecting irrigation which might be taken up as famine works.

(i) Cuttack district south of the Mahanadi. At the end of the Taldandah Canal, the tract bounded on the north by the Taldandah Canal, on the south by the Kujunj River, on the east by the Santra River, and on the west by the "Rudi Nadi" during a failure of rainfall, suffers considerably from drought. By making a new distributary taking off from the 40th mile of the Taldandah Canal and ending at Patli Hat on the closed-up Pankpal River and bunding up the Paradeep River near its off-take from the Santra River, which is also closed, to keep out the tidal water, 10 square miles area could be protected.



No. 13 Distributary could, as an alternative, be extended. The scheme would be absolutely useless except in a case of severe drought. As a rule the tract gets as much water as is required.

(ii) On the Machgong Nos. 14 and 15 Distributaries might be constructed. At present only their head sluices have been built to command the areas between Gorudmal and Sogole. Here again these distributaries would be quite useless, except in seasons of drought—area 6 square miles.

(iii) A weir across the Surua at its head and a distributary along the right bank of this river would irrigate the tract of country between the Surua to the north and country in a line from Balihanta to end of Surua right embankment to the south and east, and Puri trunk road to the west. This portion during scanty rainfall suffers from drought. Such a distributary would not interfere with the regime of the Surua in the way of having to have a protective embankment made as one already exists—area 40 square miles.

(iv) Weirs could be thrown across the Sukpyka and Mahanadi Rivers at the heads of the Sukpyka and Paika Islands to irrigate some 30 square miles by a canal running

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down the middle of the islands. Sukpyka has some of the most valuable land in the district. These works would be purely famine protective. In high floods, the distributary would of course be expected to be damaged badly.

(v) Puri district.—In order to prevent breaches indiscriminately in the embankments on the rivers of the Puri district, it is proposed to make escapes in selected portions of these embankments to let out the excess water that the rivers cannot carry without breaching. If these escapes be made of weirs of the necessary height to effect this object, and be in addition provided with shutters in times of scanty rainfall, the shutters could be dropped and the country irrigated. This applies to country lying from the lower portion of the Koakhya (Balibanta to Surdaipur) and the Daya to the west to Panchir on the east.

(vi) The channels from embankment might be remodelled and cleared of silt.

(vii) Improvement of the Gohri River below Kendrapara would prevent damage from flood of the irrigated tracts which occasionally suffer.

5. PRIVATE IRRIGATION WORKS OTHER THAN WELLS.

Brief description of such works (including field embankments); by whom constructed and controlled.

On the Kapali Nala, the zamindars had about eleven embankments across the nala with escapes, by which they raised the level of the water and conveyed it by channels to their rice lands; this stream being an important drainage has been declared under the Embankment Act and cross dams are prohibited.

In the Kujung Estate on the north of Cuttack district, there are various circuit embankments constructed to keep out flood and sea water; these embankments are also utilised for holding up rainfall for rice cultivation.

In the Puri district, the villagers put temporary bunds in the streams to irrigate lands in small areas. One work only—

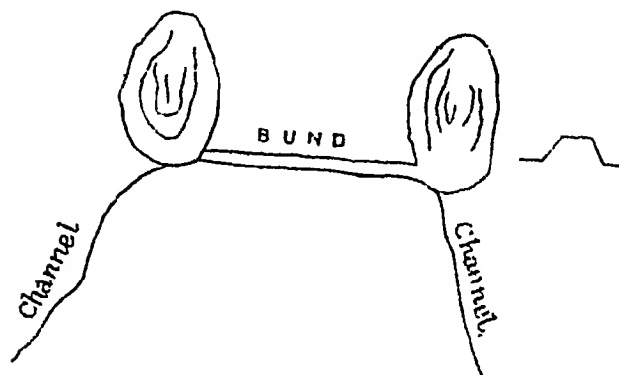
(a) Is of any importance constructed at Audong Mal where Babu Bhagabati Charan Chatterjee has constructed a bund in the upper portion of the Salia River, which crosses the Ganjam road in the 71st mile, and has made two irrigation channels, one on each side of the river. This irrigates about 1,000 acres. Permission was obtained from the Collector. The position on the sketch map is assumed, as the place has not been visited.

(b) The Khurda Estate being a Government one is managed by the Collector of Puri, and although it is not a private agency, still, what has been done in the way of irrigation, has been effected from estate funds and no charge is made for the use of the water. It may briefly be decided under this head—

I take the different portions of the Ganjam Road as the basis.

I.—Barang to Chandka.—An area of 6,400 acres, irrigated by bunding up channels running from the hill to the Daya or Koakhya.

II.—Chandka to Chuttabar.—Land lying to the west of the Ganjam Road about four miles away at Minchinpatna; a reservoir has been made between two hills as in sketch:—



This irrigates about 1,000 acres.

III.—Two miles away is another reservoir called the Gupta bund irrigating about 200 acres.

Chuttabar to Khurda.—On both sides of the road channels running from the hills are bunded up. They irrigate about 20,000 acres.

IV.—Khurda to Baghmari.—About 15,000 acres irrigated by bunding drainage channels, and by overflow of the Mahanadi River. A few small reservoirs have been made by the Estate Improvement Fund.

V.—Khurda to Jenbua.—Very hilly country, about 60,000 acres, out of which 20,000 are hills. Streams are bunded, and also the Monaguni River for irrigation.

VI.—Jenbua to Tunghi.—Land to left of road irrigated by bunding up the Monaguni River. To the right by a reservoir at Bhagaiput made by the Public Works Department out of Estate funds.

VII.—Tunghi to Kusmi.—From hills to the Chilka Lake, about 4,000 acres, irrigated from the Kusmi River by means of two regulators made out of Estate Improvement Fund.

An irrigation scheme proposed by the Public Works Department in 1877 or 1878, but not carried out.

VIII.—Kusmi to Sonakhala.—Four square miles irrigated by the Kusmi river regulator and 4 square miles by bunding natural drainages.

Sonakhala to Solari Hill.—Irrigation by bunding drainages and bunding the Bagchalia River, also by the reservoir made 60 or 80 years ago by villagers, one of which is called the Jogi bund, of which there is a drawing in the Superintending Engineer's office. Irrigates 1,000 acres.

Solari Hill to Kumirpara River.—Irrigation by tanks made by the "Khas Mahal" and also bunding the Kumirpara River. Area 1,800 acres.

Kumirpara River to Burkul.—Area about 10,000 acres of good land. A sluice made by the Public Works Department from "Khas Mahal" funds in the mouth of the Sapua River (a branch of the Salia) joining the Kumirpara River, irrigates this land with the help of the Salia bund (also made by the Public Works Department and paid for by the Estate), which prevents the water of the Salia from spilling.

Burkul to Chattragarh.—(Boundary between Madras and Orissa). About 200 acres irrigated by reservoirs made from Estate funds.

IX.—No care is taken with all these reservoirs, etc.—The reservoirs are leased out for fishing and the fishermen cut the bunds which are never properly filled up before the rains.

A sketch map to illustrate the above is enclosed.

By whom constructed and controlled—

(a) The work, constructed by Babu Bhagabati Charan Chatterjee, is controlled by a man appointed by him.

(b) The embankments and reservoirs made by the Khurda Improvement Fund are looked after by an Estate Overseer helped by the Sarbarakars (Tehsildars) who get a 20 to 60 per cent. deduction in their rent as payment.

State of repairs—

(a) Babu Bhagabati Charan Chatterjee's work is said to be in good repair; the owner wishes to make the weir *pakka*. He has already spent Rs. 3,000 on the work.

(b) Not good.

Their liability to failure in a year of drought.

Most of these works have some storage capacity and their object is to provide irrigation in October, November; there is very little chance of their failing, as a complete failure of rains in Orissa is most improbable.

Obstacles, if any, to their extension.

Want of capital and engineering knowledge.

Extent to which construction has been assisted by advances from Government.

Not known.

Concessions, if any, given to the construction of such work.

Not known.

Obstacles to their extension and possibility of stimulating their construction in tracts liable to famine.

See 3rd paragraph above.

Can new works of this kind be constructed without the permission of Government or without reference to their possible effect in intercepting the supply to either Government or private works.

Yes, excepting in the areas declared under the Embankment Act. Government has no works near. There might in some cases be local private claims.

6.—WELLS.

District or tracts in which well cultivation is most largely practised.

Practically none in the district for irrigation. There are sufficient jores and nullas, from which water can be raised by "tenda" or bamboo water-lift. "Sena" basket worked by two men or a janta (Karin of Bihar) canoe-shaped wooden water-scoop.

The subsoil water is often brackish, so probably not suitable for irrigation. Near the High Level Canal there are about a dozen wells 10' x 10' or 12' x 12' square used for irrigating sugarcane.

Average depth of water below general surface in each district in tract.

The subsoil water is high; 5 to 10 feet below the level of the ground in rains, and 10 to 20 feet at other times.

Cost of wells used to irrigation.

Cost of well Rs. 10 to Rs. 40.

Average area irrigated per well.

Average area irrigated, 4 acres.

Extent to which the supply of water is affected by drought.

Probable fall of subsoil water 5 feet average.

Concessions, if any, given to the constructors of new wells.

Nil.

Is it possible or desirable to stimulate the construction of new wells by more liberal advances or inducements?

Possible, but no necessity.

7.—BLACK COTTON SOIL.

None in the district. The nearest approach is Keloa Matul mentioned above by (11. Character of the Soils).

8.—WATER-RATES AND DISTRIBUTION OF WATER ON GOVERNMENT WORKS.

Scale of water-rates on—

Minor Works Nil.

Major Works—

Schedule of rates to be charged for water supplied from the Orissa Canals.

Per man.
Rs. A.

(1) On a lease for a term of years for the irrigation of all crops on the land leased (supply of water given from 16th June to 31st March each year) 1 8*

(2) For such lands included in a lease for a term of years as may be classified by the Canal Officer under Rule 3 as only deriving material benefit in seasons of short rainfall 0 8

These rates fall due on the 1st February of each year.

Season leases kharif.

(3) For the irrigation of autumn rice, water supplied from 16th June to 30th November 3 0
Rate falls due on 1st February following.

(4) For the irrigation of sugarcane water supplied throughout the cultivation of the crop 5 0
Rate falls due on 1st February following.

(5) For the irrigation of sugarcane between 1st April and 16th June 3 8

(6) For single waterings to sugarcane between 1st April and 16th June, per watering 1 5

(7) For the irrigation of indigo, cotton or any crops other than sugarcane, water supplied from March to June 1 8

For items 6, 6, and 7 rate falls due on 1st July.

Rabi.

(8) For the irrigation of *datura* rice, cotton, tobacco, turmeric, ginger, wheat, vegetables, sugarcane or any crop other than the crops specified below, water supplied from November to end of March 1 8

(9) For irrigation of cheena, oil-seeds, and pulses, water supplied from November to end of March 1 0

Rate falls due on 5th April.

Provisional Leases.

(10) For water supplied to irrigate rice or other crops on lands for which a preliminary application for a lease for a term of years or for a season lease for autumn rice has been received and failing the completion of such lease, water supplied from date of lease till 30th November 3 0

Rate falls due on 1st February following.

Unauthorized use of water and waste of water.

(11) For the unauthorized use of water or for waste of water, such rate may be charged as determined by the Divisional Canal Officer under Rule 29, subject to a maximum of 5 0

Such rate shall fall due, and shall be payable on presentation of the copy of assessment to the person assessed.

Supply of water.

12. Water when supplied by volume for irrigation from tanks or otherwise Rs. 1 per 10,000 cubic feet.

How is the distribution of water arranged for and controlled.

The height of the river from which the canals draw water is regulated by raising or lowering some of the anicut shutters. The anicut being fitted with under-slucio shutters and crest shutters—each week the Sectional Officers send a water indent to the Sub-divisional Officer who issues a water order for the week based on these indents.

Copy of the water order is sent to the person in charge of the canal head sluice for supply, and to the Sectional Officers to take and distribute their amount of water.

The distributaries are provided with head sluices and many of the outlets from the distributaries are permanent, regulated to give water at the rate of 80 acres to the cubic foot per second, on the supposition that one complete watering is given in 15 days: actually it takes about three weeks to irrigate the whole area and there is hardly ever any necessity to effect it quicker than this, though a cautious Irrigation Officer will always anticipate a break in the rains at any critical period and force canal water on to the people who are apt to delay before asking for water.

Calculation for discharge at canal head sluice is based at about 65 acres to the cubic foot per second.

The canals are provided with escapes which are used for disposing of surplus water.

The actual discharges in the canal are checked by observations made by a Velocity Observer and the discharges are also checked at the lock weirs.

Effect of years of favourable rainfall on the demand for irrigation and on irrigation revenue.

In years of favourable rainfall it is only the higher sandy lands that require irrigation and the heavy decrease of revenue in the years 1883-84 and 1893-94, already noted on, show the loss to be expected if a number of leases fall out immediately previous to a year of favourable rainfall.

This difficulty is being gradually obviated by giving leases up to ten years and arranging that about equal areas shall lapse each year.

* For water supplied on leases executed from 1st July 1902 Rs. 1-12 per man. Bengal Government Notification No. 141 of 1st July 1902.

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1. Q. (The President).—How long have you had personal acquaintance with these canals?—Ten years ago I was here in a sub-division.

2. Q. You know them all well, I suppose?—All the Midnapore canals, and I have seen something less of the Mahanadi.

3. Q. I suppose you do not see any prospect of these canals ever paying a dividend?—No, I am afraid they will not.

4. Q. It would require an increased area, or the imposition of a higher rate?—Unless it were an owner's protection rate. Eight annas on 300,000 acres is 2½ lakhs.

5. Q. You consider that, with the existing canals and distributaries, by increasing village channels and minor lines of distribution, you can increase irrigation by an appreciable quantity?—No; it is not necessary at all to increase the minor channels. As it stands now, we have so much water that it does not matter if it is wasted. We are running the Sone flushing system of clearing silt. The duty is 115. 60 here, but it is probably 115. 60 or 70 in the Sone.

6. Q. There does not appear to be much steady increase?—I think it is somewhat steady. In 1893-94 it was 103,000 acres and went up to 203,000 in 1900-01. It depends on dry years and the number of years that lapse to a certain extent. In 1895-96 the area was lowest, but since then the increase has been steady. This year we have gone up another 20,000; I suppose it is about two lakhs twenty thousand now.

7. Q. You say "it will be noticed that, excepting the year 1900-01, the highest duties were obtained in the years of greatest demand, say 1891-92 and 1896-97, whilst the lowest duty occurred in 1895-96, when the irrigated area reached its lowest figure." That is quite natural, but you say it is "exactly contrary to what is found in the Sone Canals," because it is the average discharge, which is not a safe guide?—That was written in Mr. Horn's office. It is modified later on page 4. These results agree well with those obtained in the Sone Canals as regards the duty of water for *khari* at a time of pressing demand. One reason why the duty might increase in Orissa with a keen demand is that at the time of a keen demand the villagers use the water for irrigation purposes only; whereas, when the demand is not so severe, besides taking the water required for irrigation, they will take as much water as they can across their lands, and escape it into drainages for the sake of the silt and fish.

8. Q. Is there no extension of works which it would be possible to carry out, which would not very much burden the capital account and would improve the financial position of the canal?—I think not. We have quite reached the limit. If there was more demand, we could get water where it was wanted somehow. Somewhere near Jaypur there will be some little extension.

9. Q. There is no project of taking on the high level canal to Balasore?—No. In the Government estate, near the Salindi river, the Magistrate suggested that some means of taking the water out of that river is desirable, and, if necessary, sending water down the canal from the Hyturnee, because the Salindi river is so liable to flood there, it is doubtful if any such project would pay.

10. Q. You quote Mr. Maddox on page 6—"I think that it would not be unfair to adopt the original proposal of Colonel Gulliver and impose a cess of eight annas per acre on all protected lands. This would bring in about 2½ lakhs and would represent but a fraction of the benefit enjoyed by rayats and zamindars." Would it not be more natural to put it into his settlement at once?—Government called on Mr. Maddox to report about an owner's rate. He went into it very thoroughly and that is the result he comes to, and so far as I understand, Government accepts that an owner's water rate cannot be put on. The increase of revenue and settlement due to the canal is Rs. 25,000 only, which is nothing.

11. Q. He thinks that the insurance against disaster is worth a heavy cess?—For the zamindars he puts 4 annas only, for the greater ease in collecting rents.

12. Q. You say 75,752 applications were made for new leases. Is that right?—No; it should be applications for 75,752 acres. The average area actually irrigated per square mile commanded comes out at 238 acres on the Mahanadi, and 318 on the High level canal, so you can safely call it 300 acres per square mile, or half the area.

13. Q. As to the Midnapore canals?—Mr. DeMello wrote that note, based on my figures.

14. Q. I see (page 2) that the irrigable area is a third of that commanded, 125,000 acres irrigable, and the average area of *khari* and *rabi* irrigated is 74,882 and 1,221 acres, respectively. You are running up pretty well?—They want over a lakh.

15. Q. I suppose the circumstances there are pretty much the same as in Orissa?—Very much. Anything below 15 feet Reduced Mean Sea Level never requires water. They use 5 feet of min and water on the Sone Canal, 6½ feet here and 4½ at Midnapore. The extra here is because we give it them. They could do without it.

16. Q. In dry years the supply in the Cossya rivers from which the canals are supplied is precarious?—Very.

17. Q. Have you ever been cut down on account of that; in 1896-97, for instance?—On page 2 of my first note I give the results, 1883-84, 500 cusecs irrigated a lakh; in 1888, 300 irrigated 60,000; in 1896-97, 400 irrigated 65,000, but they had a good deal of trouble about it.

18. Q. How do you suppose the high duty in 1883-84 was got? The available supply for October was 500 cusecs which just irrigated 100,000 acres?—If they get irrigated in five weeks, they are quite happy; quite different from the Sone. Generally one makes a good start by giving them water a week before they want it.

19. Q. It is a wonderfully high duty to get?—Over many years it works out that they only take 15 inches canal water every year against 2½ feet in the Sone.

20. Q. You say in answer to question 6 "Excepting for about 60,000 or 65,000 acres of higher lands, there is no real demand of canal water for irrigating the 130,000 acres culturable." That is in an ordinary year, I suppose?—Yes. In years of drought there will be a demand. In the Midgilee District they grow excellent crops and ask for no irrigation water at all.

21. Q. You continue—"Leases are taken for other lands for the sake of the silt in the water as an insurance against the years of drought, and to save the rayats the trouble of storing water." Do they ever store water?—That is, saves them making up their field *bunds*; they are very lazy.

22. Q. You say: "My experience of the result of draining irrigated lands is that it gives the rayats more trouble in maintaining their field *bunds*. For the Midnapore canals drainage is not generally necessary excepting for excessive rainfall or floods, as the rayats do not 'Nigari,' and most of the crops are broadcast." Do you consider drainage unnecessary?—It depends on circumstances. There are the two classes of lands. The flat lands of Midnapur which you want to treat as much like a big *jhil* as you can. On the Midnapur canals they band up the drainage cut, and the water irrigates the lower lands. Here it is different. The country is undulating, and the distributaries run down the ridges, with natural nullahs as drainages between them.

23. Q. Is there any belief that in rice irrigation there is a certain amount of silt taken off, so that the water is no good to irrigate a second time with?—I do not think so. But of course they do not get the silt the second time.

24. Q. In answer to question 20 you say—"Under favourable circumstances the cost of the construction and removal of cross dams for clearing the channels comes to annas four to six an acre and is borne by the zamindar. The system works well and no legislation is required." Does the zamindar do his duty fairly well?—That is not at all in connection with the canals. It is for cross *bunds* for the Sankra and other rivers.

25. Q. Even then?—No; he does it very badly. We take a big deposit, and finish the work for him.

26. Q. I suppose he is very often much in debt?—Yes. The dams proposed for Sankra river, etc., are for irrigating lands for cold weather crops, where autumn rice cannot be grown on account of the Damooda and Cossya floods. The whole question is being taken up by Mr. Horn, Chief Engineer.

27. Q. Were you in these parts in 1896-97?—I was in England. I came to Balasore at the end of 1896.

28. Q. There have been no famine relief works here for a long time? I have never heard of any. For the Nagpore famine three years ago we exported a lot of rice.

29. Q. You find the revenue system works well?—Very well.

30. Q. The District Officers and Engineers pull together?—There is only the Canal Deputy Collector and he is practically under me.

31. Q. Do the Canal Officers have magisterial powers under the Canal Act?—They never exercise them.

32. Q. (Sir Thomas Higham.)—You say that on the Orissa canals you are endeavouring to get an equal proportion of the leases to fall in every year?—Yes; the same as the block system down here, which Mr. Arnott described. You have a dozen villages and make them all lapse this year. Take another dozen and make them lapse next year. And the further idea is to arrange the times of these blocks for lapsing, so that one-tenth of the whole area lapses every year.

33. Q. So that if you had a wet year it would only affect one-tenth?—Yes.

34. Q. You do not think anything is required on the Midnapore Canal in the way of storage?—It would be a good thing, but it is quite impracticable. The cost is too much and quite out of all proportion to the result. With the canals, as they are, they will run short of water once in ten or five years, but it costs far too much to make reservoirs.

35. Q. You say you might extend the leases with ease up to 100,000 acres?—That is, once in 7 or 8 years some crops will die. It is not a perfect insurance.

36. Q. You contemplate that?—Yes.

37. Q. What is the area they now lease?—80,000.

38. Q. They actually work up to that?—75,000 is the sanctioned limit, but I took up to 80,000.

39. Q. Could they lease more than 100,000 acres if they get more water by means of storage?—I do not think so. In a dry year they might come in, but on the whole they do not want it.

40. Q. Is there the land to be irrigated?—It is low land and generally grows very good rice with the rain water.

41. Q. The amount of storage would be very small?—About 300 cusecs more.

42. Q. For how long?—Three weeks.

43. Q. It is not possible to get that at 50 or 60 miles from Midnapore?—There have been one or two inquiries, and they show that the cost is prohibitive. Mr. Horn, in his note on the Damooda floods, says that he would have been very glad to make reservoirs for the Cossye to regulate the flood, which would have been equally useful to feed the canal, but he said that it was out of the question.

44. Q. What floods?—The Cossye and Damooda waters meet and do a lot of damage north of Midnapore District.

(Mr. Rajaratna Mudaliar) asked questions on the fact that the cost of revenue collection on the Orissa Canal was 25 per cent. and on the Midnapore Canal "worse." The witness could only say the cost was being reduced and the matter was under consideration and promised to send a note.

45. Q. (Mr. Allen.)—You know the Khurda estate in Puri. Can you make any suggestion for improving the irrigation?—The works want a little more supervision. I would suggest that an Assistant Engineer be told off to go round the estate and give assistance and advice. There are about 263 schemes, on which they have spent Rs. 60,000. The average cost is Rs. 223 for each work; that is, leaving out two of the big ones. Each irrigates some 50 to 200 acres. At present they have only a sub-overseer for the district.

46. Q. Do they spend enough?—They have spent Rs. 38,000 in the last 10 years.

Note in reply to Mr. Rajaratna Mudaliar, Member, Irrigation Commission.

The revenue establishment as shown in the revenue reports for canals of Orissa, Midnapur and Sone for assessments and collections and water regulations includes pay and travelling allowances of Deputy Collector and all his permanent and temporary staff, zilladars, tahsildars, amins, clerks, peons. It also includes patrols and distributary mates, etc., employed under the Executive Engineer. In the Sone it includes also headmen's fees (about $\frac{1}{10}$ th of whole expenditure). This item does not appear for Orissa and Midnapur, as the lands of chaukidars who act as headmen are excluded from assessment, this being their pay.

The cost of revenue establishment per acre works out to over an average of 5 years (1894-95 to 1898-99)—

Sone	5½ annas (deducting headmen's fees, 4½ annas.)
Orissa	6½ "
Midnapur	5½ "

Now that maps exist for most of the irrigable areas, and that leases are more or less fixed, and superfluous registers are being abolished, the rates for Orissa and Midnapur should fall to 5½ annas and 4½ annas respectively. But in comparing these figures it must be remembered that the average holding of a rayat in Sone, Orissa and Midnapur are respectively 2½, 1½ and 1 acre, and it is the number of holdings that regulates the work of assessments and collection.

THIRTEENTH DAY.

Cuttack, 12th November 1902.

Witness No. 80.—Mr. E. M. SMITH, Deputy Commissioner, Angul.

1. Q. (The President.)—You are Deputy Commissioner of Angul, I understand?—Yes.

2. Q. Is that a large district?—It is about 1,000 square miles.

3. Q. Chiefly hilly country?—Yes, and undulating land.

4. Q. I suppose the population is rather thin?—Yes, it is a small population.

5. Q. Have you been there long?—Five years.

6. Q. Do you know if the people suffered in the great famine of Orissa?—I don't know; in 1889-1890 they suffered a good deal.

7. Q. Did the rain fail?—Yes, and the mango and mahua crops failed; if the rains fail and they get a mango or mahua crop, the scarcity is not very severe.

8. Q. Do they depend on these a good deal?—Yes, and on jungle products.

9. Q. Is there much rice grown?—Yes.

10. Q. Do they grow millets?—Yes, suan and mandia; also indian-corn.

11. Q. Do they grow cotton?—Very little.

12. Q. Do they irrigate their rice?—Yes.

Ben.

13. Q. Is the rainfall heavy?—No; the average rainfall is 47 inches; in the Khondmals it is 61 inches.

14. Q. Is there rice grown without irrigation?—Yes, a good deal is; it depends on the rainfall; the irrigated area is only 26,200 acres.

15. Q. How is that irrigated?—By dykes.

16. Q. Are there bunds in the streams?—Not many; if control could be got by means of sluices and if distributaries were made, they would be able to stand famine a great deal better.

17. Q. Have they got any tanks and reservoirs?—Not many.

18. Q. Are there many places where they might have them?—Yes, there are places if they got loans from Government on liberal terms.

19. Q. You say in reply to question 9, as to the general measures that should be adopted for extending irrigation in the district by Government or private works, "the country is backward and the people apathetic, and make little or no effort to provide themselves with dykes and dams to irrigate their lands. Angul is a Government estate; the people depend on Government to provide irrigation works. Annually Rs. 4,000 from the management grant is

Mr. C. A. White.

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Mr. E. M. Smith.

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Mr. H. M. Smith. allotted for the purpose, but this is not sufficient." What do you do with that Rs. 4,000?—I construct bunds and repair old ones.

12 Nov 02. 20. Q. Then you go on to say—"Besides the above amount, a special grant of Rs. 20,000 should be made annually for a period of five years for irrigation works"—I have revised a part of my note. My proposal is to bund up perennial streams and store water.

21. Q. Have you had any professional advice from engineers?—No; we have found that wherever these streams have been bunded, the crops have been saved.

22. Q. To what extent were they bunded?—The made weirs.

23. Q. How high are the bunds?—15 to 20 feet high.

24. Q. Have you got a district engineer there?—No, not at present.

25. Q. You would be better for having the place examined by an engineer?—Yes.

26. Q. You say in your printed note in answer to question 10—"There are 203 private tanks and reservoirs constructed by tenants at their own cost and labour. They are repaired by owners. They entirely depend on rainfall and generally dry in a year of drought." How much irrigation is there from the biggest of these?—On an average 100 acres.

27. Q. You have 16,200 acres under Government irrigation works; what are the Government works?—Dykes and bunds.

28. Q. Supposing that an engineer were to report favourably on the chances of making reservoirs for storing water, do you think the people would be willing to take *takari* advances from Government?—They take them now, not for the improvement of land, but for purchase of seed grain.

29. Q. Do they readily take advances?—No, not readily.

30. Q. What is the feeling about them?—They don't like to be indebted to Government; they can manage with jungle products.

31. Q. (Mr. Muir-Mackenzie.)—Altogether they are rather a primitive people?—Yes, but the more enlightened would be willing to take loans; the great drawback in the country is the want of communications; at present the people are not willing to take loans.

32. Q. (The President.)—Is this place very unhealthy?—It is the most unhealthy part of Orissa, especially the Khondmals.

33. Q. I suppose the country is not adapted to large irrigation works?—No; small scattered works would be very useful.

34. Q. Large irrigation works would not pay?—No; the people would be willing to pay a water-rate.

35. Q. Is there any power of combination among the people? Could you get a village to arrange to take large advances from Government for making a bund?—Yes.

36. Q. And would they make themselves personally responsible?—Yes.

37. Q. (Mr. Muir-Mackenzie.)—Has that ever been done up to the present?—No; the offer has not been made.

38. Q. (The President.)—They won't apply, do you mean?—No.

39. Q. Do they care enough about it to make an effort in this direction?—Only the more enlightened would do it.

40. Q. (Sir Thomas Higham.)—Have you ever had famine relief works in Angul?—They had in the Khondmals in 1899-1900.

41. Q. How many people were there out?—7,000.

42. Q. That was the maximum?—Yes.

43. Q. What works were they put on?—Road works.

44. Q. Do you think roads are more wanted in Angul than tanks or irrigation works?—No, but we could employ a large number on roads, because villages in the Khondmals are very small and very scattered; at that time we could not arrange to get the men to go to works; they were not accustomed to it.

45. Q. Did they work on task-work?—Yes, some were engaged on excavating a tank; but they preferred road work, because the tank was not in their own villages; they had to leave their homes and go a great distance; they wanted roads near their villages; in the Khondmals especially people will not go far.

46. Q. From the replies to answers in your note I infer the district is very badly off for roads?—Yes!

47. Q. And the people will not go on cultivating because there are not enough roads in the district?—No, they do cultivate, but they don't care to increase the production, because there are no purchasers; they want only enough to maintain themselves.

48. Q. Do they have tanks?—No, dykes.

49. Q. Right across the field or river?—Across the field.

50. Q. I suppose they have them in almost every village?—Yes, a few; they want a great deal more.

51. Q. Why don't you employ famine relief labour on that?—We do in Angul.

52. Q. If you put up dams in the drainage lines as you suggest, and draw off water for irrigation, would not they often irrigate partly in zamindari land and partly in Government land?—No, because the whole of Angul belongs to Government; there are no zamindaris. In the Khondmals they pay no rent, but only a voluntary contribution, 3 annas per plough for opening out communications; Government pays an equal sum.

53. Q. If Government made any work for the benefit of the tenants, could it get anything out of them in the form of a higher rent on water-rate?—Yes, the rent is nominal.

54. Q. What extra rent could you get?—I think half more.

55. Q. (Mr. Allen.)—What are the rates?—Rs. 1.5 an acre average for paddy land.

56. Q. Would they pay more?—Yes.

57. Q. There would be no legal objection to your raising it?—No.

58. Q. (Mr. Muir-Mackenzie.)—With regard to this Rs. 4,000 spent annually from the management grant, have you taken additional rent in consequence of that expenditure?—No; there is a settlement for 15 years.

59. Q. Has it ever been proposed to raise the rent?—The agreement is not to raise rent; the term has only four years to run; then there will be a new settlement.

60. Q. Is there any objection to raising the rent during the currency of the settlement if Government makes an improvement?—Yes, because there is the condition not to raise the rent, but they might pay a water-rate; they were consulted about that two years ago and they agreed.

61. Q. No water-rates have been taken?—No.

62. Q. Have improvements brought more land under cultivation?—Yes.

63. Q. Has rent been obtained in respect of land brought under cultivation?—Yes.

64. Q. So that the rent has increased in consequence of the improvement?—Where they have cultivated new lands.

65. Q. What extent has been brought under cultivation in consequence of those improvements?—I cannot say.

66. Q. Roughly, not as much as 10,000 acres?—Perhaps about 5,000 acres.

67. Q. How much has been spent?—About Rs. 11,000.

68. Q. How much more rent has been obtained?—That for new lands cultivated; the *sarrakar* gets rents that for new lands cultivated; the *sarrakar* gets rent during the currency of the settlement.

69. Q. Does he take half rates or full rates?—Full rates; the rates are very small.

70. Q. How much?—Rs. 1-2 per acre on an average.

71. Q. He gets Rs. 1-2 in consequence of the improvement that Government has made?—In order to induce tenants to come and cultivate.

72. Q. At the end of the 15 years' period that belongs to Government?—Yes, unless the *sarrakar* gets people to come and settle, it will be difficult to get them to do so. As soon as Government makes another settlement, it gets the whole.

73. Q. Would it be wise to make a condition that if work is undertaken, the *sarrakar* should pay additional rent?—Yes.

74. Q. Would the *sarrakar* accept it?—Yes.

75. Q. These streams that you propose to dam up, would they fail in a year of drought?—No, not altogether.

76. Q. Not even in the very worst year?—No.

77. Q. Are you able to confirm that from observation?—I have seen streams running in a very bad year; this is a very bad year; there has been no rain since September, and some of the streams still contain water, though not all.

78. Q. You would, I suppose, have to be careful in selecting your streams?—Yes.

79. Q. The *sarvakar* gets additional rent for land brought under cultivation?—Yes, to induce people to cultivate.

80. Q. Have not tenants under the *sarvakar* the power to take advances to undertake works of any size?—They have the power; a lump sum could be given to each village.

81. Q. They can be induced to combine?—Yes, I think so, for dykes. We don't give individual sums, but a lump sum, and the village is responsible for repayment of the money.

82. Q. Does Angul require as much development as the Mahanadi tracts?—Not as much. I think until roads are made they will not take advances; the first thing to do is to open up communications.

83. Q. (The President.)—How near is the nearest point of railway?—Cuttack, 64 miles; there are two rivers between.

84. Q. Which are not bridged?—No.

85. Q. (Mr. Rajaratna Mudaliar.)—What concessions are given to tenants to construct dykes and embankments?—We take no rent for the land on which dykes are constructed.

86. Q. If new land is brought under cultivation?—Then the *sarvakar* will get rent, not we.

87. Q. Is the tenant not exempt from payment for some years?—No; rents are very low.

88. Q. Is the land submerged very often cultivated when water runs off?—No; that would destroy the dyke. You can understand how backward the country is when I say that in a place 40 miles from Angul there are leaf-wearers still.

89. Q. At present are tenants eager to take loans for land improvement?—Not in Angul.

90. Q. If loans were granted free of interest, would they take them?—No, unless they can sell their surplus produce, they will have nothing to do with Government money.

91. Q. (Mr. Allen.)—Are you making roads gradually?—Yes; in Angul there are 160 miles; we want village roads.

92. Q. Is Government giving money every year for your roads?—Yes.

93. Q. How much?—Rs. 2,300 from the Estate Improvement Fund; Rs. 9,000 from the Provincial Fund; this amount is only for maintaining existing roads; we cannot make any new roads.

94. Q. Were you ever in the Khurda Estate?—No.

95. Q. What grant should be given annually for irrigation?—I cannot say; it will depend on the result of enquiry to be conducted by professional agency.

96. Q. You want an engineer to advise you; what class of man should he be?—A district engineer.

97. Q. Would an overseer not do?—No.

98. Q. You have no officers of the kind you want?—Not at present.

99. Q. (Mr. Muir-Mackenzie.)—Who does your roads?—The roads are constructed under my supervision by an overseer. We want professional agency, and a man with some experience. A district engineer had charge of the Ward States, but he stayed 40 miles away.

100. Q. (Mr. Allen.)—What is the Ward State?—Denkanal, which is a Tributary State under Government management owing to the Chief being a minor.

101. Q. Under your control?—Yes.

102. Q. There has been a small expenditure under the Agricultural Loans Act?—Yes.

103. Q. What revenue does Government get?—Rs. 86,000.

104. Q. And none from the Khondmals?—No.

105. Q. When was your last settlement of Angul?—10 years ago.

106. Q. Was there a classification of land?—Yes, at the cadastral survey.

107. Q. How many classes of rice land are there?—About a dozen.

108. Q. In the same village?—No, but in the same locality. Properly speaking there are not more than three classes of rice land.

109. Q. You spoke of tanks; are they excavated tanks or merely formed by bunds?—They are excavated tanks.

110. Q. For drinking water or irrigation? Both. In Angul they are not suited to irrigation.

111. Q. You have large streams and tributaries from the Mahanadi?—Yes.

112. Q. Are they perennial?—Yes.

113. Q. There would be no difficulty in finding perennial streams?—No.

114. Q. This Rs. 4,000 that Government spent is direct expenditure?—Yes.

115. Q. (Mr. Muir-Mackenzie.)—Do you know what amount was spent in the District in 1889-90?—Rs. 26,000 were spent in Angul; I don't know the amount spent in the Khondmals.

116. Q. In gratuitous relief?—Yes.

117. Q. What was the maximum number of people on relief?—I cannot say. 7 per cent. of the population would need work and 5 per cent. gratuitous relief in Angul.

118. Q. How do you come to that conclusion?—From the number who have no lands and who do very little work. The men are not accustomed to regular work.

119. Q. Did anything like that number receive relief in 1889-90?—I think so.

Mr. E. M. Smith

12 Nov 03.

WITNESS No. 81.—MR. H. BARLOW, Executive Engineer, Brahmini-Byturnes Division, Cuttack.

1. Q. (The President.)—You are Executive Engineer of this Division?—Yes.

2. Q. How long have you been in Orissa?—Four years.

3. Q. During that time has there been failure of rain?—This year the rains failed from the 25th of September to the 25th of October.

4. Q. Were the people anxious?—Yes, they kept watching the sky till the *pujahs* were over, and when the rain did not come they came in for leases.

5. Q. Were there fresh leases?—Yes.

6. Q. How much is on lease just now?—85,000 acres.

7. Q. How many came in last month?—There were about 2,000 renewals and 2,000 new applications since the failure of the rains in September.

8. Q. There are leases for 10 years?—For periods varying from one year to ten according to the block.

9. Q. Are you near the limit?—We have very nearly come to the limit on the Kendraparn; on the Patamoundee we could take more.

10. Q. Have the people the option of taking season leases?—Yes, at an extra rate of Rs. 3 as against Rs. 1-12-0.

11. Q. What is the maximum discharge of the Patamoundee?—We can take anything up to 800; we can give them 600.

12. Q. What prevents them taking 800?—We cannot always get it through from the river.

13. Q. Are your distributaries nearly complete for that canal?—Very nearly; there are a few places where they have not been made, which were partly leased this year.

14. Q. What do they pay on the lease?—The rate has been raised from Re. 1-8-0 to Re. 1-12-0.

15. Q. Could it go much higher?—In some parts it might, not generally.

16. Q. Is any mischief produced on low lands from water-logging?—No, not much; low lands are not leased at all; we lease only high lands.

17. Q. Have you any recommendations to make for your Division?—Very little indeed; a few village channels might be made; there is practically nothing that can be done in the way of a big improvement.

18. Q. Do you keep up a register of famine works?—Yes, we have made a few new estimates.

19. Q. What are they generally?—One of the projects was to improve the course of the Gobri.

20. Q. Do matters go on smoothly between the Executive Engineer and his officials and the revenue officials?—Generally I think they do.

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21. Q. Is there any part of the proceedings attended with difficulty and which could be improved?—The present system is all right; it depends on the individual; provided the right individual is there the system works very well.

22. Q. Does the charge of the embankments give you much to do?—Very little most years.

23. Q. (Sir Thomas Higham).—Is your proposed estimate for distributaries closed?—Yes.

24. Q. You have no new distributaries to propose?—There was one proposed the other day from No. 11 Patra-moondie Canal (explained on map); it is under consideration.

25. Q. Less than half the area commanded by these distributaries does not appear to be fit for irrigation?—There is a good deal that is not fit for irrigation.

26. Q. What is the total area that is fit for irrigation?—About 120,000 acres.

27. Q. What is the most ever done?—85,000 to 90,000 acres.

28. Q. Have you ever worked up to 90,000 acres?—Not quite.

29. Q. In 1898 you appear to have done 74,000 acres. Was that a good year?—Not very good; we did more than this year; we did 85,000 nearly.

30. Q. Have you got enough water for all that you can do?—We have just got enough; there is practically nothing to spare in the Kendrapara Canal.

31. Q. What is the area you gave out on leases?—83,000 acres.

32. Q. Are there any sluices in the embankments?—Yes, some.

33. Q. In canal embankments?—There are a few syphons for drainage purposes.

34. Q. Over and above the area leased is there an area on which water flows from the higher fields that is not paid for?

35. Q. (Mr. Muir-Mackenzie).—Does it amount to 25 per cent.?—Not nearly that; most of the land that gets it does not really require the water.

36. Q. (Sir Thomas Higham).—It is none the better for having it?—Very seldom.

37. Q. You don't charge anything?—No.

38. Q. Are you able to prevent that by apportioning the supply to each block?—We have done that, but have not stopped it entirely.

39. Q. Have you contracted the size of your outlets?—Yes we are making them *pakka*; originally they were *lachha*.

40. Q. What is the size of the outlet?—Two to nine inches. We go on the assumption that 80 acres can be irrigated from one foot of water. We observe the head of each outlet.

41. Q. That varies?—Yes, very much.

42. Q. I suppose you keep up a constant supply in your canal?—When running a full supply, otherwise the head varies a good deal.

43. Q. Does it vary also owing to the silt?—Yes.

44. Q. Who clears the silt?—Government clears it.

45. Q. Do you clear all the channels?—Yes.

46. Q. Do they require clearance every year?—Not all; some do.

47. Q. Have you any drainage channels that you have closed?—Yes, there are a good many.

48. Q. Could you give water in a dry year without waiting for applications for a lease?—It would be rather difficult for a big area with the present supply.

49. Q. Is there much boat traffic?—Not much; the canal is mostly used for local trade. There is some rice export via False Point to Colombo and Mauritius, and some export and import by steamer to and from Calcutta.

49. Q. Do the people not use the canals for sending their produce away?—In some years they do when there is a demand.

50. Q. We were told yesterday that they use carts; is that so?—They cart to the canal and then use the canal to reach the main mart.

51. Q. They cart from their villages?—Yes.

52. Q. Do they send their carts to Cuttack?—There are a few.

53. Q. Have you any charge besides this?—The regulation of the rivers and the canal workshops at Jobra.

54. Q. Are the whole of the *anients* under you?—Yes, the Mahanadi, Beropa and Weraj (Kutjarie) *anients*.

55. Q. Have you any general works outside?—There are a few buildings at Chandbally and Hoorkitollah, etc.

56. Q. Have you anything to do with District Boards?—No.

57. Q. (Mr. Muir-Mackenzie).—In the carriage of produce do the roads beat the canals, or the canals the roads?—Canals.

58. Q. Do you ever have threatened breaches in time of flood and have to use urgent measures to stop them?—Yes, that frequently happens.

59. Q. Have you any difficulty in getting the labour?—Not, as a rule. I had difficulty in 1891. None of the local villagers would turn out, and we had to send to a distance to get contractors' coolies.

60. Q. Sometimes you would not have time?—No.

61. Q. Do you have to give men very high wages in order to get them to turn out?—The ordinary wages plus a little extra.

62. Q. There is no difficulty you are not likely to be able to surmount?—I think not.

63. Q. (Mr. Rajaratna Mudaliar).—How much do you spend on silt clearing?—There used to be a good deal spent; but since we have reduced the size of the channel and lowered the crest of the 1st waste weir there has been very little spent on silt clearing, Rs. 4,000 or Rs. 5,000 a year only at most. We have made the channel just sufficiently big to pass the discharge with a velocity of about 2 feet a second and that keeps the silt moving.

64. Q. You clear the village channels also?—Those belonging to Government, not the private ones.

65. Q. I thought very few channels were made by the people?—There are a few.

66. Q. In other parts only the channels leading to the villages are maintained by the Public Works Department, and the minor distributaries are attended to by the people?—We only keep in repair the part we made originally.

67. Q. The minor distributaries also may be made by the Government in this district?—Yes.

68. Q. In one case you said that you had a scheme for irrigating 5,000 acres by a distributary. That irrigates more than one village?—About fifteen.

69. Q. Would you in future be able to leave it to the villagers to make the distributaries?—They do sometimes make very small channels, but they have very little combination in Orissa for any work in a village.

70. Q. The measurements are made by the *zilladars*?—By the *amins* under the *zilladar's* instructions.

71. Q. Would it not tend to economy if the Revenue Department in each Division were placed under the control of the Executive Engineer?—That is a question I have not considered.

72. Q. The powers of officers under the Irrigation Act are sufficient?—I think so.

73. Q. (Mr. Muir-Mackenzie).—Have you any power to demand work from the people in cases of emergency?—Under the Irrigation Act.

74. Q. Is it never put into force?—I have once or twice pulled down roofs under the Act to put in breaches. They did not like it.

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WITNESS No. 82.—MR. W. A. INGLIS, Chief Engineer, Public Works Department, Bengal.

(Replies to printed questions.)

A.—GENERAL.

1. To the deltaic part of Orissa. I have been in charge

of the Orissa Canals as Superintending Engineer for several years.

2. Taking the mean of the ten years ending 31st December 1900, the average, based on observations at 13 stations, has been—

	Inches.
January	0.21
February	0.66
March	0.87
April	1.37
May	5.41
June	9.98
July	11.51
August	18.70
September	10.94
October	6.08
November	1.30
December	0.04

3. (1) No.

(2) No.

(3) No.

(4) No.

(5) No.

(6) I do not think so. Possibly the cultivation of sugarcane might be extended a little with more capital, but there is not much land suited for it under the conditions of soil and rainfall which obtain in Orissa.

(7) I do not think so.

(8) I do not think so.

(9) The irrigation from the Orissa Canals is almost entirely that of rice. The rainfall is generally ample, and the irrigation from the canals chiefly valuable as a guarantee, and in giving to a certain extent an increase in the yield. The only apparent obstacle to an extension of irrigation is the apathy of the cultivators and the fact that in seasons of favourable rainfall the use of the canal water does not give any considerable increase in the yield, excepting when the fields are comparatively high, and such lands are mostly under regular irrigation.

B.—CANALS OF CONTINUOUS FLOW.

7. (1) There is very little, if any, increase of this nature in Orissa. The great bulk of the irrigated land yields one crop only of rice. Some of the lighter soils give a crop of early rice followed by a crop of some pulse, but the latter is not irrigated nor does it require irrigation. To a very small extent, a second crop of late rice is grown on the same land as the early rice with the assistance of canal irrigation, but this is confined to plots close to a village which can be manured.

(2) To a very small extent in Orissa. In some cases the later rice has been substituted for the early rice, but as the former is not succeeded by a second crop while the latter usually is, it is difficult to say if there is any material increase in the yield, though there is perhaps more certainty.

(3) (a) If it is to be considered that the ample rainfall is well distributed, the increase due to canal irrigation can only be very small, if any. Near the heads of the canals the silt in the river water has probably some good effect. However, in many years of ample rainfall, it is not uniformly distributed, and the yield is increased by the use of canal water. I would give the increase of yield as 1 to 2 maunds of paddy (unhusked grain), per acre for a year of ample rainfall.

(b) In a year of scanty rainfall very much depends on the distribution of the fall. The critical time in Orissa, as elsewhere in Bengal, is October. In a year in which there is scanty rain at this time the increased yield due to canal irrigation may be taken as an average at 8 to 10 maunds of paddy per acre, or nearly half the normal yield.

(c) In a year of drought, it may be assumed that the greater part of the rice crop would be lost altogether without irrigation, while with irrigation nearly a full crop could be obtained. In such a case the increase in yield may be taken at 16 to 20 maunds of paddy per acre.

8. (1) There is no accurate information available. A considerable number of experiments have been made at various times, but they have all been on very small areas, and they have not been made continuously on the same plots. In the report on the recent settlement of the Land Revenue in Orissa, the Settlement Officer (Mr. Maddox) gives Rs. 4 per acre as the value of the additional yield of *sarad* rice, which is the main crop (paragraph 109, page 83 of report). Our departmental experiments show a larger increase in favour of irrigated lands; but as I have said above, I do not think it would be prudent to base any definite conclusions on them. I think that having regard to the fact that the sale value of rice is now higher than it was, and that owing to improved means of communication it will remain higher, the increase in the annual sale value due to irrigation in Orissa may be taken at not less than Rs. 5 an acre on the average of normal seasons. I think that it is of much importance that the Agricultural Department, working with the Irrigation Department, should ascertain more precisely what the real value of irrigation in Orissa is. The observations should be on areas of considerable size, and should be continuous for at least ten years.

(2) In a year of drought when there would be a failure more or less complete of the unirrigated crop the sale value of the increase in the yield due to irrigation would probably be about Rs. 30 an acre, or possibly rather more as the sale value of the crop would be high. An absolute drought is, however, practically an unknown thing in Orissa, and if it did occur, it is doubtful what area we could fully irrigate.

9. (1) The average rate paid for irrigation in Orissa is Rs. 1-4 per acre. It is paid by the cultivator in the form of a water-rate. For the main rice crop, it is paid on the area which is included in the irrigation lease which runs for a certain number of years. The land on which the rate is paid is practically all irrigated every year. For the spring rice and for sugarcane, the rate is paid according to the use made of the water, that is according to the area actually irrigated whether included in the lease or not. The areas under these crops are small.

(2) I understand that the Settlement Officers came to the conclusion that there had been very little enhancement of rents by the zamindars on account of irrigation.

(3) There is no direct payment by the owner of the land to Government on account of irrigation. To a small extent the land revenue paid by the owners under the recent settlement may have been increased on account of the security afforded by the facilities for irrigation. That is the share of the assets taken by Government may be greater where the rents are secured. However, this is a point on which I have no direct knowledge.

10. Practically *nil*. In Orissa the irrigation being entirely that of rice and the country being very flat, field channels are hardly required and minor distributaries are constructed at the expense of Government.

11. I do not think that there has been any deterioration of the soil in Orissa or damage to the people. It seems that rice can be cultivated on the same land year after year without any material alteration in the yield. The silt in the river water does good, and the rice lands are also manured to a certain extent.

There is no salt efflorescence in Orissa.

As regards drainage, there is no drainage in the sense of removing water from the sub-soil, nor can there be such in a rice-growing country where complete saturation of the soil is required. The form that the question takes in Orissa is whether it is better to keep the natural flow of the surface water unimpeded, or even to assist it by digging drainage channels, and to supply water as may be required from a canal, or whether it is better to hold up the surface water in basins and to do without the canal water. It is a question that cannot be answered at present. I consider that it is one which deserves the attention of the Agricultural Department.

Note on Irrigation Works suggesting the desirability of a more systematic record, both of the supply of water, whether above or below ground, available for the extension of small works for irrigation, and of the manner in which, and the extent to which, the supply is at present made use of.

I venture to bring before the Commission my ideas as to the importance of obtaining a more complete record, than exists at present, of the conditions under which, and the extent to which, irrigation is carried on from wells and from the smaller streams throughout the country. It seems to

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me that before attempting to draw up any complete, or even general, scheme for developing the resources of the country by means of minor works for irrigation, it is necessary to have information as specific, as possible, as to the sources of supply of water, whether above or below ground, as to the nature of the soil and climate, as to the crops which are most suitable, as to the extent to which the water is already made use of, and as to difficulties which are found in such use or which may be in the way of an extended use.

2. What I would aim at is some form of Agricultural Gazetteer for each district, in which information on the above lines should be recorded.

The first step would be the preparation of a map, on a sufficiently large scale to show the drainage systems accurately with catchment areas, and to allow of the nature of the soil and the comparative inclination of the ground being indicated. The position of the stations at which the rainfall is gauged should be shown. In districts where irrigation from wells obtains, the comparative extent of such irrigation in different parts might be indicated by colours, and also the approximate depth at which water is obtained. Similarly, in districts such as Gaya in Bihar, where there is a system of *pains* or artificial channels leading from the hill streams and used for feeding shallow reservoirs or for direct irrigation, the position of the *pains* and the extent of the irrigation should be indicated.

In other districts, again, such as Puri in Orissa, where water is at times drawn from the rivers through sluices in flood embankments, the position of the sluices and the areas served should be shown. The extent of irrigation which obtains at other seasons in the same district by lifting the water from the beds of rivers should also be indicated. In another part of this district, again, there is irrigation from springs and small hill streams which is of value. Generally the maps should give an idea of the economic condition of the district as far as soil, crops, rainfall, and irrigation are concerned. In districts liable to inundation the lands protected from or exposed to flood should be indicated.

At the time of preparation of the maps the particulars as to soil, crops, etc., should be scheduled in such detail as may be necessary to give them a real value. In some provinces I have no doubt that much, if not all, that I have suggested is already done, but in Bengal, which is the only province of which I have any personal knowledge, the information, if available at all, is certainly not recorded in such a way as to be readily accessible.

3. The practicability of extending irrigation depends, of course, mainly on the supply of water which can be made available at times of drought. The nature of the soil is however an important factor. Some idea of the probable supply available, whether for direct use or for storage, can be formed from the statistics of catchment areas and rainfall, but it is of much importance that the actual flow of the streams should be gauged. It should not be difficult to arrange to have this done, either making weirs in the streams or by shaping and grading a certain length of the channel, so that in either case sufficiently accurate information could be deduced from the readings of gauges fixed at the discharge sites. While recording the description of the catchment of the streams, which would include the inclination of the ground and the nature of the soil, particular attention should be given to the selection of sites which might be suitable for storage reservoirs.

4. In recording the nature and extent of existing irrigation from the smaller streams, it will be necessary to form an estimate of how far the supply has already been taken up and what the rights of the holders of the lands now irrigated are to a continuance of the supply. It may often happen that the construction of a weir or dam in the upper part of a stream will deprive those lower down of a supply at times of drought, while, from the same stream a supply can safely be withdrawn at times of ordinary or full flow to feed storage reservoirs in the upper part. In the Gaya district in Bihar the *pains* take off water generally without any weir or ponding of the river from which they draw, and, if I remember right, each *pain* is, by custom, entitled to a certain length of the river bed above its head in which collecting channels may be made in the sand to catch the under-flow during the dry season.

5. The extent to which rights to the use of running water have been acquired by the holders of private estates, as against the common or natural right of the public, which is, I believe, under our constitution, vested in the Crown, is an interesting, if somewhat intricate, question. It seems to me that it is time that the general position as to rights in water in India, including private rights as recognised by the Civil Courts or as acknowledged by custom, as well as

public rights established by the Legislative Acts of the different Provinces, should be made clear. We have an excellent guide in Baird-Smith's work on Italian Irrigation, and it is rather strange that we should have done for Italy what we have not yet done for India. What I would suggest is a work divided into five parts—

I. "Historical."

II. "Legislation, including decrees of Civil Courts and rights acknowledged by custom."

III. "The practice and extent of irrigation." This part should deal with the detailed distribution of the water. The engineering features of the large works have already been dealt with in Mr. Buckley's book. Illustrations would be required. The methods in use on small private works should be described as well as those on the Government canals. The areas at present under irrigation of all kinds should be given, not merely those on the Government canals.

IV. "The economy of irrigation." This should treat of the duty of the water, of the rates charged or cost incurred, and of the increase in yield of the soil, both as regards quantity and value, due to irrigation.

V. "Protection from flood." This should give a record of existing facts as to flood embankments, and should notice the history of the subject and such evidence as there is as to the comparative value of protected and inundated lands.

Each part would have to be subdivided by provinces.

It is obvious that a work of this nature, to cover the whole of India, is somewhat ambitious, and that it must take considerable time and labour to compile. It would be necessary first to collect the information in each province and then to have a review of the whole by a special officer. However, having regard to the prominent place which the regulation and use of water must always have in the well-being of India, I think that no pains should be spared to have complete information and to have it recorded in such a shape that it can be made of practical value.

6. Returning to the question of the preparation of district gazetteers, it is necessary to consider what agency should be employed. I think that the work should be done mainly by the staff of the District Boards. The members of the Boards are the representatives of the landlords and cultivators, and a matter such as this, which is intimately connected with the internal economy of the district, seems to me eminently one which they should attend to. The recording of the statistics relating to the catchment areas, and the gauging of the streams, should be supervised by the Public Works Department, and the records of soils, crops, and rainfall by the Agricultural Department.

7. Assuming that such records have been achieved, and that it has been ascertained that in certain localities the improvement of existing means of irrigation or the construction of new works is desirable and feasible, the very important point arises as to how to get the necessary works carried out. It is doubtless very desirable that such works as are contemplated in this note should be carried out by the landholders. Where there are large estates with individual proprietors the landlords will no doubt come forward if some assistance is given by Government in advancing money on easy terms and in giving advice and supervision on the design and construction of the works. There must, however, be many cases in which estates are small, or in which there are many sharers in an estate, and in which it will be difficult for those interested to come to any mutual agreement, either as to what works should be made or how the available supply of water is to be divided after the works have been made. In such cases, it seems to me that there is nothing for it but that Government, either directly or through the District Boards, should take action. The experience of the Madras Presidency, which takes the lead in the matter of minor irrigation works, should be of much assistance on this and on other points whether engineering or revenue. However, it is no use trying to arrange for everything at once. What we want, first of all, is information as to the existing position, and to obtain this information it is requisite that a system may be devised under which the statistics required shall be recorded as a part of the ordinary administrative work of the country, and not merely by spasmodic efforts made on the occurrence of famine.

8. It is generally admitted that, "example is better than precept," and I think that in all districts in which it is desirable to encourage the growth of small works for irrigation, there should be experimental farms on a fairly large scale to show how the irrigation should be done, and to demonstrate its true economic value. In some places this could be done by the officers in charge of estates which are under the direct management of Government, in others it might be done by the District Boards, and in others again by leading landed proprietors.

In all cases the Department of Agriculture, working in conjunction with the Public Works Department, should supervise and should review and publish the results annually. Great results must not be expected at once. It is to be remembered that a development of irrigation of the nature sought must be the work rather of generations than of years. What is required is to initiate a system to aid such development, and then to see that it is not allowed to be lost sight of.

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1. Q. (The President.)—How long were you here?—About six years.

2. Q. Had you personal acquaintance with it before then?—No.

3. Q. You were here in 1896-97?—From July 1896.

4. Q. Had you famine works going on under you?—There were no relief works. The District Board made the attempt to get the people to work on relief terms, but they said the District Engineer was a fool to think that they would work at those rates.

5. Q. I suppose you never have seen distress in Orissa?—No. That year there was a little near the Chilka lake. But that is the part where they are flooded by the salt water. They are always in a precarious state.

6. Q. The precariousness does not arise from want of rain?—No, from the salt water inundation.

7. Q. The people are called upon to pay the full amount they ought to pay?—It is a matter of contract or agreement.

8. Q. If leases had to be renewed, would there be any room for raising them?—No; certain lessees would take water at the enhanced rate and others would give it up.

9. Q. Even in ordinary years the irrigated lands bear a larger produce than the unirrigated?—I think they must. But we have not much accurate information about that. Our experiments have been on such a small area.

10. Q. (Mr. Muir-Mackenzie.)—Do you doubt the accuracy of the Settlement Officer's figures?—They are all founded on such minute areas, about $\frac{1}{2}$ or $\frac{1}{3}$ of an acre, and it is extremely difficult to select a certain piece of a field to give a fair sample of what three or four hundred acres should be.

11. Q. (The President.)—With reference to the present position of irrigation here, by far the most expensive parts of the system have been these great weirs. Are there no minor works of extension or improvements which will confer a benefit or would otherwise make the whole scheme more financially sound, any lines of distributaries which would cost little themselves and would bring in a large income?—That is fairly well provided. In the meantime we can utilise our existing supply of water without any difficulty and simple means will facilitate the carriage of water to particular places, and with that we get small increases of irrigation. These are being gradually made, and extensions and improvements are being made out of the revenue as a rule.

12. Q. How much water do you utilise on the high level canal?—On the first range we use 600 cusecs. That is from the Mahanadi to the Brahmini river. That supplies about 25,000 acres of suitable land for irrigation. The second range from the Brahmini is only about 12 miles long and has no distributaries at all. The country is liable to flood. It irrigates a few thousand acres. The third takes off from the Byturne and goes as far as the Salludi and there we use about 600 cusecs.

13. Q. This canal was primarily meant for navigation?—That was probably an idea in the design of the works.

14. Q. And it was to go on to Midnapore?—Yes.

15. Q. You use now on this incomplete payment the water intended for the whole?—As far as required to keep the canal full as a navigable channel. It costs a good deal. We keep it full all the year round and in the hot weather discharge very little into it. The first and third ranges are both very useful for irrigation and are fully leased up.

16. Q. You have an executive engineer for the lines?—Yes, there is an executive engineer in charge of the high level canal and the works connected with it.

17. Q. There is not a great deal to do, I suppose?—It is a very light division. I have made a suggestion that some of the Aogal works might be attached to that division. There is a good deal wanted there in the making up of roads. We are making a small work in that division; the Dudai Canal to bring water for the irrigation of the spring rice. It is being made with no banks above ground. The

water is to be within ground, so that when a flood comes it will pass over the whole thing.

18. Q. In your statistics do you keep any separate heading for the cost of maintenance of irrigation?—There are certain items such as the maintenance of locks and silt clearings, but it is almost impossible to say precisely what should be charged to the one or the other. The returns furnished to the Government of India have to be put down in more or less arbitrary figures. The cost of navigation establishment is known. That is booked separately; and the maintenance of locks and weirs. But they (i.e., locks and weirs) are apt to be mixed up together.

19. Q. We saw to-day the principal navigation lines?—Yes, to show how traffic has dropped in a few years; in 1897-98 the tonnage was 460,490 and last year 210,000; that is, tonnage of cargo and boat. In 1897, however, it included material going up for the railways.

20. Q. The divisions altogether must be lighter than when the works were in an earlier stage?—The Brahmini and Byturne Division and high level canals division are certainly light.

21. Q. In your note of October 3rd you propose that the materials should be collected for hydrographic data?—What has always struck me is, our want of definite information. This is illustrated by Mr. Smith's evidence in which he stated that certain streams have water always in them. Such a statement requires to be proved, not merely asserted. It is necessary to take the average of years and know how much water you have got. We want a systematic record of these streams kept every October (the critical time in Bengal).

22. Q. Would that be an instruction to your executive staff?—They could do it within their ordinary divisions, but a great deal can be done by the District Board Engineers; they cover a much larger range.

23. Q. You would combine with that the maintenance of gauges?—Yes. I propose that there should be small weirs in these streams, the more important ones, and gauges kept there. It would be a simple enough thing—introduced gradually.

24. Q. (Sir Thomas Higham.)—The original estimate for the Orissa canals supposes that they commanded something like 1,200 square miles?—They estimated an irrigable area of 1,200,000 acres.

25. Q. You now have a gross area of about 600,000?—Under present conditions. Part of the original plan was never carried out; it included a canal from Bhadrak to Balasore, and works in the Puri District. That accounts for 600,000.

26. Q. So that in the parts that were made the difference is not so very great?—Not so very great. It was to some extent over-estimated.

27. Q. They originally thought that they would get 500 acres in the square mile?—It comes now to about 300. We have estimated as irrigable 264,000 as against 524,000 shown as under command—about half. That was based on detailed enquiries to a large extent.

28. Q. You struck out all the low land that never wants water and all the high land that you could not get water on to?—By flow; they won't take water by lift here.

29. Q. Could you command that high land?—In places by special minor distributaries.

30. Q. The average value of an acre of paddy is about—?—That would depend on the year and the selling prices. If one takes a yield of 25 maunds of paddy to the acre at Rs. 1-8, it would be something between Rs. 35 and Rs. 40.

31. Q. That is on irrigated land only. For unirrigated they will not get so much?—It varies so much. In some of our experiments we have taken that part of the district

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which is not irrigated and the yield has been just as high if the inundation has been favourable; but it is not so certain. We have not had the experiments over a sufficient number of years to say what the true difference is.

32. Q. You do not think there is any increase in favourable years?—I put it down at about Rs. 2 an acre. There is the advantage of being able to take the water at any particular period.

33. Q. For Re. 2 they have to pay Re. 1-8 or Rs. 1-12?—But in other years it may be worth Rs. 5 or Rs. 7 an acre.

34. Q. (Mr. Allen).—The silt is worth something too?—At the head of the canal, but 20 miles from the head the water has dropped the greater part of it.

35. Q. (Sir Thomas Higham).—What is this Re. 1-12?—The 4 annas added this year.

36. Q. Have orders been issued for that?—Last April.

37. Q. Has it been charged this year?—Yes, on all the leases granted this year. The charge is 8 annas for lands that require a little water, and nothing for some lands in very low places; that don't want it, though we cannot help the water going on.

38. Q. What is the average rate paid?—It was about Re. 1-4 when it was Re. 1-8. The amount of 8 annas land is small. It would be Re. 1-6 if it were all Re. 1-8.

39. Q. If you take the average increase in value at Rs. 5, the water-rate paid is something over Re. 1-8. That leaves a balance of Rs. 8-8. To whom does that go?—The tenant. I don't think the landlord gets much out of that; not in Orissa.

40. Q. Is that the general rule?—The zamindar gets his rent for certain, but not much extra.

41. Q. You could not put a higher rate on the owner?—It is a commercial matter. If you charge more, he would say that he would do without it. We really do not quite know what the real benefit is, and we want more accurate information about that before we attempt to put on anything higher.

42. Q. I suppose you must put a rate over a series of years; you could not vary it according to the season?—I am afraid that is hopeless. It was proposed to vary it according to the land; higher lands at one rate and lower at another.

43. Q. You do that now to a certain extent?—A little, but it was proposed to have a regular statement classification. It was considered impractical.

44. Q. What was the objection?—When Mr. Smith was Commissioner of Orissa, he wrote—"I do not think that Rs. 3 an acre is an excessive average rate to look forward to. It would, however, be advisable to test what would be a final fair rate by a series of experiments continued through a series of years, and it would also be expedient to test by similar actual experiment whether different rates should not be charged for different classes of land, taking particular note of the effects on the high lands near the canal and the low lands more remote." It was, I think, negatived by the Board of Revenue.

45. Q. Has there been any falling off in consequence of the higher leases?—No; owing to the October rain being short there is an increase.

46. Q. Are the people grumbling?—I have not been here since that was started. They probably have not realised it, because they have not paid it yet.

47. Q. They paid a great deal more some years ago?—The rates were higher, but the area irrigated was very much less.

48. Q. What was the rate?—They started with a rate of Rs. 2-8; that was given up a good long time ago. In 1866 they began by selling by volume, Re. 1 a thousand cubic yards, and Rs. 3 per acre for a single crop or Rs. 5 per annum and Re. 1-8 for single waterings.

49. Q. They never sold it by volume?—They never succeeded in having any practical system for this.

50. Q. I do not understand what was the origin of the Orissa Coast Canal?—I do not know anything about that.

51. Q. The original proposal was, I understand, that the high level canal should go up from Bhadrak to Midnapore, and that appears to have been stopped?—It was an entirely separate scheme.

52. Q. (The President).—It was to go right round the whole way to Puri?—To unite eventually with the Madras Canals, I think.

53. (The Commissioner).—The idea was to connect Puri with Calcutta by means of this coast canal and take advantage of the traffic of pilgrims who wanted to avoid the dangers of navigation by sea. It had nothing to do with irrigation.

54. Q. (Sir Thomas Higham).—What does the coast canal tap?—Hardly anything. It gets a little local trade.

55. Q. As a matter of fact, all the rice exported from Cuttack goes to Chandbally?—Yes, and then up by sea. It is much easier.

56. Q. They have to tranship?—But they get it into a big steamer which takes it much quicker and cheaper. By canal they must have launches to pull them up.

57. Q. Do you know what the traffic receipts are on the coast canal?—The gross revenue is Rs. 73,000 in 1898-99. It has been worked at a loss.

58. Q. It is getting worse and worse?—Yes. It has been suggested in the last settlement report that the thing might be given up, but it has been decided to keep it on as being of some general use to the country. They can work it at about Rs. 7,000 cost above what they get.

59. Q. Do you propose that anything should be done in the Puri District in the way of the extension of irrigation or protection from floods?—For irrigation there are several small schemes in the Khurda Estate. There is no proposal for a large scheme. As regards flooding protection, I suggest, as a measure of economy, the making of permanent outlets in the banks of the rivers instead of letting the banks breach.

60. Q. These outlets would escape into the Chilka lake?—In this part of the country much the greater part of the district must go under water, and it is only a matter of selecting the places at which the water is to leave the rivers. The lower channels can only carry $\frac{1}{2}$ or $\frac{1}{3}$ of the water which goes into the head.

61. Q. You have done nothing for the district?—Except a little to the embankments.

62. Q. They have been talking all this year about making the escape?—I sent proposals for it last June.

63. Q. What expense do you propose?—Not very large. One of these escapages would cost about Rs. 3,500; another Rs. 3,800; another Rs. 5,350; others Rs. 8,700, Rs. 7,500 and Rs. 8,200. The total expense is not a very large thing.

64. Q. Would that be done by Government?—Yes; in Orissa under the Embankment Act you can charge nothing to the zamindars.

65. Q. Has any of that been done by famine labour?—It would not be very suitable work—mostly rubble stone-work.

66. Q. There is a lot of earthwork?—Only cutting down a piece of bank and rivetting it with stone.

67. Q. They have never had much relief labour in Puri?—Not since 1866.

68. Q. Would you wait for a famine?—No. I have worked it out, taking into account the interest on the money and cost of maintaining. It will be cheaper to do this than to pay what we have been paying for filling up breaches.

69. Q. Have the officers on the three canal divisions any other work?—The Mahanadi Division has heavy buildings and roads work, and the Agnapsada has the trunk road which is Provincial. The Brahmini and Byturnee Division has very little except irrigation work.

70. Q. What was the arrangement for dividing establishment charges?—For the Roads and Buildings Branch work we take 23 per cent. on the outlay and the balance goes against the revenue of the canals.

71. Q. Does that bear unfairly on the canals?—No. The Government of India have just sent round asking whether the charge of 23 per cent. is a good one. I think myself it is fair. It is rather for the Roads and Buildings Branch to grumble.

72. Q. In the Bombay Presidency we found the arrangement press very heavy on the irrigation works?—We only allow the District Board 15 per cent. when they do our work.

73. Q. But you have to supervise?—Yes.

74. Q. (Mr. Muir-Mackenzie).—I understand from your book that the canal cannot protect more than 264,000 acres?—With the existing supply we can get into the canals.

75. Q. Was it the canals that in 1896-97 saved the district from famine?—It eased matters very much. But

I can hardly say that things were so bad that there would have been a famine if there had not been a canal, because tracts outside the canal irrigation were by no means all bad. A lot of low land would not take water even that year.

76. Q. The district has never been put to such a test since 1885-86?—Nothing of the same nature.

77. Q. Do people come from the unirrigated area to get employment in the irrigated area?—In 1896 we had some rather heavy repairs to do owing to a bank breaching on the canal, but they would take no work on relief terms.

78. Q. But agricultural labour?—At that time the railway was being made and that gave employment to a very large number.

79. Q. The conditions are altogether very obscured. I also see you put down the area affected by percolation at 25 per cent.?—That is not a matter on which we have much information; but we are putting on to the land a large volume of water of which a certain proportion must run off into the drainages, and in a dry year it would be utilised on lower lands.

80. Q. (*Mr. Rajaratna Mudaliar*).—Ought it not to be charged for?—It is quite impracticable.

81. Q. Could you not deprive the people of it?—Yes. We did so to such an extent that we had a commission to inquire into the grievances of the people who complained about it.

82. Q. (*Mr. Muir-Mackenzie*).—Then there is nothing to deprive the people of the water they get by the canals over-running?—Yes. At present they store water to a certain extent. The Irrigation Act gives power for certain reasons to open up drainage lines. What happened was that without specifying reasons drainage lines were generally opened up and the people prevented from bunding them.

83. Q. Have you ever had cause to put in force the provisions of the Irrigation Act for labour in emergencies?—I do not think we have any provisions in our Act.

84. Q. It is not necessary?—I think not.

85. Q. As to the desirability of more systematic record, you said you would like to see the streams gauged. What limit would you fix to that. There are thousands of streams?—First of all you would have to have the drainage areas marked out and take streams where the drainage area is over a certain size. Then you would only gauge streams of a considerable size.

86. Q. Would the expense be great?—I do not think so. The District Board should take up that work. They have the staff on the spot, who are competent to do this gauging.

87. Q. Are they competent to select the areas?—The maps we have got show the drainage areas very fairly.

88. Q. The district staff would not require the aid of a special officer?—There should be some supervision by the Superintending Engineers as is now given.

89. Q. But nothing like a man per district?—No. My idea is that the thing should be done in the course of twenty years.

90. Q. Some witnesses have suggested that there should be a survey of some districts were exposed to famine for the purpose of ascertaining what minor irrigation works might be made. Would such a thing be of any use?—The question is whether it should be done immediately or gradually.

91. Q. If it was done by the existing agency, could it be performed in a reasonable time?—I see no reason why it should not.

92. Q. In a district specially liable to famine you might put on a special agency to get the thing quickly accomplished?—Yes.

93. Q. What would you do to ascertain the level of the sub-soil water for well purposes?—Measure the water in the existing wells.

94. Q. It would not be necessary to bore?—Hardly.

95. Q. Well irrigation differs very much in Bihar. What is that due to—the idiosyncracies of the people?—Very much to the nature of the soil. A great deal of Northern Bihar soil is not suited for irrigation at all. The planters think it ruins the soil. There the moisture keeps coming up from below in the hot weather. In Champaran they look on wells as bad, because there are salts in the water. In South Bihar the salt is just sufficient to act as a manure. They say the canal water was never good for poppy on the Son.

Ben.

96. Q. (*The President*).—It was too cold? Partly that, and it had not stimulating powers.

97. Q. (*Mr. Muir-Mackenzie*).—Has it been ascertained by analysis?—In parts of Champaran it is almost saline to the taste.

98. Q. But whether it is a nitrate salt or not?—I cannot say.

99. Q. (*Mr. Allen*).—Inquiries are being made now. In the area of Bihar, with which you are acquainted where the soil is suitable for well irrigation, is there room for considerable extension?—The parts I know best are where the canals have come on; they have greatly reduced well irrigation. Saran I only know a little.

100. Q. For recording the nature and extent of existing irrigation and so on; the agency of the Settlement Department may be largely employed?—It would take a long time. The Khurda State Manager says they irrigate 60,000 or 60,000 acres. These areas are not reckoned in the irrigated area of the provinces, and there is much minor irrigation done which we do not know much about.

101. Q. Supposing that the record was compiled of the rights in water as you say you would like to see, would the enforcement of those rights be entrusted to the Collector instead of being left, as it is, more or less to the Civil Courts?—That is a matter on which I can hardly give an opinion. I was once asked by a Civil Court to act as Commissioner in a case of a dispute as to the right of taking water from a certain *pain*. The Courts had given decision in favour of one man, but it was ordered that in executing the decree, he was not to do any injury to the other; whereas, if he took the water, he must do some injury. I reported, however, that the decree had been carried out in a reasonable manner and that was accepted. The Civil Courts who decide cases of this sort have probably very little idea of the facts. This order was impracticable. The case probably cost thousands of rupees, but the decision eventually arrived at might easily have been come to with no expense.

102. Q. Do you think that on the smaller streams for which these *pains* are taken the water is probably very badly managed and regulated owing to the rule-of-thumb way in which things are done?—No, the people are very careful in the use of water. The *bunds* breach for want of any escapages; that is one of the chief things.

103. Q. (*Mr. Rajaratna Mudaliar*).—Mr. White said that you would be able to give us information about the high cost of establishment on the Orissa canals?—I have got the figures for the last five years here. They show that in 1897-98 the cost was Rs. 67,839, and last year, 1901-02, it had got down to Rs. 59,993, so that we have reduced it a good deal in the last five years. It is one of the points we have always been trying to deal with.

104. Q. What does that include?—It includes the Deputy Collector's pay and the pay of the *amins*, *tahsildars*, and other subordinates.

105. Q. (*The President*).—Does it include any part of the pay of the Chief Engineer or the Executive Engineer?—No; it is merely the revenue establishment charge, pure and simple. It merely includes the cost of the staff employed purely and simply on the work of assessment and collection; we are always trying to get it reduced, and we have made some reductions in the last five years.

106. Q. (*Mr. Rajaratna Mudaliar*).—Would it be an improvement if this revenue establishment—the Deputy Collector and his staff—were placed under the Executive Engineer in each district?—There is only one Deputy Collector for each circle, and therefore he must work under the Superintending Engineer and his staff must work under him. We have not got it on a large enough scale to give each division a separate charge. It costs us nearly 20 per cent. of our irrigation rates for assessment and collection, which of course is exorbitant.

107. Q. The proprietor employs his own *patwari* to collect his rent; does he not?—I cannot say here how they collect. I don't think they have *patwaris* here.

108. Q. Could you not by employing a *patwari* for, say, 10 miles length of the canal, or a defined area, reduce the cost of collection?—We had a system of collecting through the village headmen, and the men got commission for this work, but they never paid up punctually, but were always in arrears, so we don't allow that now. We found on the whole that we managed to get our collections done very much better by employing our own staff.

Mr.
W. A. Inglis.

12 Nov. 02.

WITNESS No. 88.—MR. K. G. GUPTA, Commissioner of the Orissa Division, Cuttack.

Mr. K. G.
Gupta.

12 Nov. 02.

1. Q. (*The President*).—We have learnt so much about Orissa and its canals during our stay here that I really don't know that there is much more left to ask about. So I would invite you to give your own views on any points you would like to speak about?—It is rather a difficult way of dealing with the matter. I should prefer to answer questions, and towards the end, if I have anything more to add, I will do so.

2. Q. I would ask to begin with in a broad way; do you consider that this province with its canals and its railway is satisfactorily protected from famine?—Yes, from severe famine certainly. The railway does not protect it from famine, but it of course helps to lessen the suffering in times of distress by bringing in supplies from other places.

3. Q. That keeps the prices down?—Yes, to a certain extent.

4. Q. Then I suppose you consider it is in a very much superior position to what it was in 1865-66?—Infinitely more so.

5. Q. It seems to me that we have not been in a more protected part than this in Bengal?—East Bengal is absolutely protected, and there is never any chance of a scarcity even.

6. Q. Puri and Balasore are practically without irrigation. Puri has no irrigation at all and Balasore has very little. Things being as satisfactory as they are in Orissa, do you consider it is worth while going on any further in these districts?—Not in the way of big irrigation schemes, but I think we may do a lot to improve matters in both districts. The greater portion of these districts has been temporarily settled, so that anything which might be done to improve cultivation and prevent not only drought, but also other evils, would not only benefit the people, but also benefit Government, as we have found from the results of the irrigation schemes in Cuttack that the Government has to a very large extent participated in the benefit secured to the district by irrigation.

7. Q. (*Mr. MacLennan*).—In what way?—Because of the larger rents. Lands which paid a small assessment under the old settlement are paying much higher rents under the new settlement.

8. Q. On account of the advantages of irrigation?—And also protection from floods. I was in charge of the Kendrapata Sub-division for sometime some years ago, and there are several tracts there which do not benefit so much from irrigation as from protection, and the rents have gone up tremendously. Of course Government did not get an immediate benefit there, but they have got the full benefit during this recent settlement.

9. Q. (*The President*).—Do you think that there is room for increasing the water-rate?—I am afraid not.

10. Q. These canals here from a financial point of view are a dead failure; are they not?—Yes, because I am afraid they were undertaken on too ambitious a scale. For instance, the high level canal, which passes through very difficult country, must have been a very expensive piece of work, but as far as irrigation is concerned, very little has been done by it.

11. Q. (*Sir Thomas Higham*).—Any navigation on it?—There is very little navigation.

12. Q. They lead nowhere too?—Yes.

13. Q. (*The President*).—Do you approve of the lease system of water as is carried out here?—I don't know any other system.

14. Q. There is another system of joining it with the revenue as they have got in the Godavery District. And then in the Punjab and in the whole of the North of India there is merely a water-rate on the area irrigated. A man pays from season to season for the water he uses?—I think that would be very unworkable here for this reason; that the rainfall in ordinary years is abundant, and it is only in years of scanty rainfall that water would be required.

15. Q. On the other hand, take the province as a whole, or for a matter of that any district in Bengal which is satisfactorily protected from famine, and in the protection of which irrigation plays a part, would you think it right to put a small cess, say, of a quarter anna on the rupee, upon the whole district, because it is generally protected? I will give you a case in point. I don't know if you know Bihar?—Yes, I have been to all the districts.

16. Q. I dare say you may know all about the cost of irrigation in the Saran District. There was a fitful kind of irrigation carried on there. The planters guaranteed to pay

for the opening of certain sluices in the Gandak embankment; but for sometime past it has been practically ceased and great pressure was put upon us the other day when we were there by not only the planters, but by the Collector, and with the approval of the Commissioner of the Division that we should recommend the re-opening of these canals, and as a water-rate per acre would probably never pay, a small cess might be laid on the whole of the district, and that the people would be glad to take to this?—I am very doubtful if people would gladly take to a general cess of this kind, because when anybody pays a special cess he likes to see that he gets some benefit from it. I don't think a sort of insurance cess like this would be appreciated by the vast majority of the people who are not affected by it directly. If the scheme covers very nearly the whole of the district, then I can well understand it being imposed as a general cess.

17. Q. You would not advocate a scheme of that sort for Orissa at any rate?—No, because, as regards Orissa, the irrigation scheme only affects about one-third of the Cuttack District.

18. Q. Do you think the system that has been arrived at of the relations between the Revenue officers and the Public Works Department officers is a satisfactory one and works well?—Yes, I think it has been working very well. In the early days when I was in this province there was a good deal of friction, and I had something to do in bringing these matters to notice, and then there was a commission of enquiry in 1884, and I gave evidence before that commission also. Since then I have not heard of any serious complaints in that direction. People have got accustomed to the system, and I suppose the officers also have learnt to behave better.

19. Q. In Madras the Executive Engineers and Public Works Department officers have nothing to do with the revenue management. They have merely got their canal and distributary channels to look after?—In Madras, of course, they have got such a complete revenue agency that this is possible; we have got nothing of that sort here. There is no village agency to speak of in any part of Bengal—a revenue agency I mean. If we had a standing agency of that sort as they have in Madras, I can well understand it undertaking this duty.

20. Q. Do you think that this measure of navigation that you have here is really a boon to the people and a convenience?—It ought to be, but it is not taken sufficient advantage of and I think the chief reason for this lies in the absence of marts. With the exception perhaps of Chandbail in the Balasore District and the Sub-divisional head-quarters of Kendrapata, there are no marts of any importance anywhere. All the trading is done in the villages by itinerant traders. It is very different here to Bengal. In Bengal in every district there are numerous marts and all the produce of the country goes into these marts and are thence sent to different places. Here there is an absence of marts and people are supplied from the country *kuts*. Along the pilgrim route there are a few shops where the pilgrims put up, but outside them there are very few places where you have got a collection of shopkeepers.

21. Q. (*Sir Thomas Higham*).—Have they a depôt at Kendrapata?—Not a large one.

22. Q. Is there a market there?—Yes. Beyond that there is nothing, and there are depôts at Chandbail.

23. Q. (*The President*).—Is there much for the Government to take up in this higher country behind where you have got small rajas and people of that sort? Do you think that the Government should interfere more there?—No, I don't think Government should interfere directly. Of tributary States there are 17 in Orissa. There are almost always a few under Government management owing either to the minority of the chiefs or to the incapacity of the chiefs. I think we might show the other States an example by doing what is useful in those States. And besides them, right in the centre of this group of tributary States we have the British territory of Angul, and before we ask them to do anything, we might make a beginning in our district by showing them what can be done by a judicious system of irrigation to improve the revenue.

24. Q. The revenue of Angul is small?—Yes.

25. Q. Mr. Smith strongly advocated roads as the proper thing?—Of course roads are wanted no doubt, but I don't think roads are everything. Unless there is any produce roads are of no good, and in the cold weather there is no difficulty in getting about from place to place, so that, if

there was any produce to be sent, there would be no difficulty at all to send it away.

26. Q. (*Mr. Muir-Mackenzie*).—Does the produce come down the Mahanadi?—Yes, all the way from Sambalpur.

27. Q. With regard to the benefit derived by Government in the enhancement of rent from irrigation, you remember that Mr. Maddox drew the conclusion that there was very little profit. He showed that the contribution was just as much in the irrigated as in the unirrigated tracts?—That is true, but there are many acres of land which would never have come under cultivation but for irrigation. I have myself seen high lands which could never bear any crops but for irrigation and these have now come under cultivation.

28. Q. Then I would also point out to you that the enhancements shown in Balasore and in Puri do not seem to be any lower than they were in Cuttack?—If my personal knowledge is right, then I should say that the amount of unculturable land is very much less in the irrigated area. I have seen in many villages lands brought under cultivation which could not possibly grow any crops without irrigation. And then there are also some notable tracts, where not so much from irrigation, but from protection, the rents have gone up from 10 to 20 times.

29. Q. Now the season of 1896-97 was not nearly so disastrous a season as that of 1865-66?—I don't think so. I fancy it could not have been, because there was no relief work to speak of except a little bit on the Chilka, which is always subject to scarcity.

30. Q. If you had a season as disastrous as that, do you think a considerable amount of relief would be required?—Yes.

31. Q. In spite of the canal?—Yes, because the canal would only affect a portion of the Cuttack District. But relief would not be required to the same extent as in 1865-66, because the railway would bring in a lot more rice and people would also be able to get away.

32. Q. But still a considerable amount of relief would be required?—Yes.

33. Q. I see in Balasore you have estimated that the number likely to require relief is 21 per cent. of the population?—That is the Collector's estimate. I think that would be too high.

34. Q. Do you not check it?—The Collectors are asked to send them direct to the Government. They are only asked to send me a copy.

35. Q. You were not asked for your opinion?—No.

(*Mr. Allan* pointed out that what was referred to was "Abstract of Statement of Famine Relief Works.")

Witness.—This passes through me.

36. Q. (*Mr. Muir-Mackenzie*).—I find here that the total number of persons likely to require work in Balasore is put down on 21 per cent. of the population and likely to require relief 33 per cent. of the population. That is the maximum number for which you estimated?—There must be something wrong about these figures.

37. Q. In Cuttack you have . . . 18.7

" Angul " . . . 12.4

" Puri " . . . 5.6

These are the figures supplied by the district officer; I did not check them.

38. Q. You don't think they can be very much relied upon?—No, because they have had no experience of famine or of any serious scarcity for many years.

39. Q. You would be rather surprised, I imagine, if you had to give relief to more than 5 per cent. of the population?—I think so.

40. Q. Is there any chance of getting *takavi* advances more easily taken in your division. Do you think for the purpose of land improvements?—In the matter of land improvements, I think, we might be a little more liberal.

41. Q. If there was more money, do you think more people would take it?—Yes.

42. Q. Is there anything at fault in the system, do you think?—No; it is I suppose because the people do not know that there is money to be had.

43. Q. Do you mean that it is not sufficiently made known to the people?—Yes.

44. Q. You don't think the people find any obstacles in having to come into head-quarters?—Not for land improvements' loans which would be taken by zamindars and people of substance who have agents here.

45. Q. You don't think the money could be yet taken by tenants?—Not for land improvements. In Orissa I don't think the tenants are sufficiently rich or influential or even enterprising enough to do so. Some *sarbarakars* in Khurda may do it.

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46. Q. What would they take it for in Khurda?—For reservoirs chiefly.

47. Q. Is not there much hope of having it taken in Angul?—No; there are hardly any middlemen there; they are very backward and half the population is almost semi-savage.

48. Q. What about the taking of *takavi* advances in other parts of Bengal. Do you think the system is all it should be?—I don't think it has been worked with a will in any part of Bengal. In the first place, we are very doubtful as to the amount of money we can get out of Government for making *takavi* advances. In most districts, if they are to be made on a liberal scale, it will require a very large sum, and I don't know if Government will be prepared to grant so much money.

49. Q. Do you think, if you had more money, it could be spent with advantage and taken up by the people?—It would be taken up by the people, but there is this difficulty, namely, to find out whether it would be usefully spent.

50. Q. You mean to say whether it is misappropriated or not?—Yes.

51. Q. Assuming that difficulty could be got over, do you think, if you had a sufficiently large inspecting staff, to discover whether the money was properly spent or not? Do you think a larger sum would be taken by the people and properly spent?—It would be taken by the people. For instance, in Balasore this year a large amount was taken as *takavi* advances.

52. Q. Supposing you could arrange that all the money given was spent on the land improvement for which it was given, do you think a very much larger sum could be disposed of?—Yes, very usefully. I think our only difficulty is not knowing how much we are likely to get for this purpose.

53. Q. Many people have urged that in taking *takavi* advances a good deal has to be paid to the *amlas*?—With proper supervision I think we can stop that.

54. Q. I am talking about loans for land improvements?—As regards loans for land improvements, there will be no difficulty at all of that kind; these loans will only be taken by people of substance who would not be under the influence of the *amlas*.

55. Q. Is it not the case that a considerable sum goes to the *amlas*?—That is not my experience. It would be taken generally by men of some influence who are not ordinary villagers, and I don't think they would pay anything to the *amlas*. It might happen in Bihar where there is much more corruption than in other places, but in Lower Bengal I don't think there would be any risk at all.

56. Q. You know Bihar?—I have never served in Bihar, but as Excise Commissioner I have been all over it.

57. Q. (*The President*).—Has Bihar got the worst reputation for corruption?—Yes.

58. Q. (*Mr. Muir-Mackenzie*).—You have not served in any of these districts like Gya where there is a considerable amount of irrigation from *pains* and *ahars*?—I have not served in any of these districts, but I have visited every district in Bengal as Excise Commissioner.

59. Q. I suppose the rights in the various water-courses are not very complicated in this division?—No; of course, when disputes arise, the zamindars usually settle them among themselves. In many places we are the landlords and we can dispose of such disputes ourselves.

60. Q. Do you think it would be a good business if such matters, even in more advanced portions of the district, were settled by the Collector rather than by the Civil Court?—Certainly.

61. Q. What would be the advantage?—Because the Collector can go to the spot and he has got a better knowledge of everything connected with land and irrigation. The Civil Courts, if they have to decide these questions, call in the evidence of experts and they do not have the advantage of local enquiry and local knowledge.

62. Q. You think the Civil Courts have got more difficulty in getting at the facts?—Yes, I think the Courts themselves will not know many of the issues.

63. Q. From your own knowledge of the people, do you think they would generally prefer the Collector as the agency for settling such disputes?—In these matters I think so.

Mr. K. G. Gupta. 64. Q. Is there any part of the country which you know where you think irrigation could be pushed with advantage?—I think we might do a lot in Angul, for instance. The country there is undulating and there are many hill streams, and I think that with a small expenditure of money we could do a lot to improve irrigation and provide against scarcity.

13 Nov. 02. 65. Q. I am talking about well irrigation now. Do you know of any parts in Bengal where well irrigation might be pushed with advantage?—Well irrigation won't do in Lower Bengal.

66. Q. And in Bihar?—I have got so little personal knowledge of the place that I hardly like to speak as to that; but, speaking generally, the people are much too lazy to lift water from a well; in some places wells do not go down low enough.

67. Q. (Mr. Rajaratna Mudaliar.)—Under the system of temporary settlement in Orissa the Government gets enhanced revenue?—Not for 30 years at least. The first settlement lasted for 60 years; after the first period of 30 years it was renewed without any fresh settlement. The recent settlement is for 30 years.

68. Q. What has been the increase in Orissa to Government in that year?—You have got it all in the settlement report.

69. Q. Cannot you say roughly?—About 65 or 60 per cent. for the whole province. The exact figures are in the reports.

70. Q. So on that ground you think the Government is bound to spend large sums on irrigation works?—I don't say they are bound to spend money, but I think it would be beneficial both to the people and to the Government, if they did so.

71. Q. What is the legal difficulty about enhancing during the currency of settlement?—Under the Tenancy Act you may not enhance under 15 years.

72. Q. (Mr. Muir-Mackenzie.)—That is not the case for improvements?—Then you have to register your improvements and go through a certain procedure.

73. Q. (Mr. Rajaratna Mudaliar.)—In the case of Orissa, for instance, a raiindar could not enhance his rent for 15 years. But supposing Government constructs a new irrigation work?—Even Government could not do this without a special Act. I don't think you could take advantage of the Tenancy Act to increase the rent, because as between the zamindar and Government it is a matter of contract, and the Tenancy Act does not apply.

74. Q. But if Government provides water to the land?—Then you have the water-rate, but you could not do it as part of the revenue.

75. Q. So they can levy a water-rate?—Of course they are levying a water-rate. That is a different thing under a different Act.

76. Q. For that you don't have to wait 15 years?—But the water-rate is a distinct thing; it is not an enhancement of revenue. It is an additional imposition payable only by lands which are benefited by irrigation under a lease.

77. Q. (The President.)—The Government is simply a merchant selling water and the people buy from it?—Quite so.

78. Q. (Mr. Rajaratna Mudaliar.)—Do you think it will be impossible to create a revenue agency similar to that prevailing in Madras?—It is not impossible; it is a matter of money and expediency.

79. Q. Do you think that such an agency could be created at a smaller cost than you have at present?—There is a proposal now for having a maintenance records agency. To a certain extent it will be something like what you have in Madras, if that proposal is accepted, but I myself would not be glad to see that elaborate agency introduced here.

80. Q. Why? It will cost less?—It won't cost less.

81. Q. (Mr. Allen.)—In Angul the Deputy Commissioner told us to-day that what was wanted was a special District Engineer for the Angul District. Do you think that is necessary?—Not a special Engineer. What you want is some sort of Public Works agency to look after the works whether it is a District Engineer or an Engineer under the Public Works Department does not matter so much. What you want is a trustworthy agency.

82. Q. You do want that?—Yes.

83. Q. What about Khurda?—We don't want any separate agency like that in Khurda. There we are trying to improve the agency we have got, and it will be worked by the District Board.

84. Q. Does Government advise the District Boards as regards irrigation then?—No, but then they lend the services of their officers to help us in carrying on our work.

85. Q. Do you think, generally speaking, that Government ought to spend a more money in Khurda and Angul on irrigation works?—Certainly; most decidedly.

86. Q. A considerable amount?—They might very advantageously spend a much larger amount there than they do now. I think they don't spend half enough. I am afraid in these matters Government is misled by the state of things in Lower Bengal, where very little irrigation is needed by most districts.

87. Q. In Khurda, if Government carries out irrigation works, could not they enhance the rents during the currency of the settlements?—I think so. Anyhow 15 years soon pass away.

88. Q. In fact, Government would reap an actual financial profit either during the currency of the present settlement or at the next?—Sure to. The schemes will be undertaken after careful enquiry and the expense will not be great, and each work will benefit a large area. There is more scope for this sort of work in Angul than in Banki or Khurda.

Memorandum of points to be considered by the Irrigation Commission in Bengal.

1. *For districts or tracts liable to famine or scarcity.*—Gross and cultivated or occupied areas of each district; average gross area annually under crop and the probable proportions of the cropped area which are irrigated by Government irrigation works, by private or village works, and by wells, respectively. General configuration of the country; character of the soils, and their suitability for irrigation. Extent to which cultivation is dependent on artificial irrigation; statistics of annual and monthly rainfall. Years in which reliable records show that there has been (1) famine, and (2) severe scarcity not amounting to famine. Staple crops for each main class of soil; times at which sown and reaped. What are the crops which require irrigation, and how many waterings do they require and at what times of the year. Utility of irrigation in increasing the produce of the land in securing it from the effects of a failure of the rainfall. General measures which should be adopted for extending irrigation in each district, either by Government or private works.
2. *Existing Government irrigation works (Imperial).*—General statement giving the following information for each work:—Capital outlay to end of 1900-01; annual gross revenue, maintenance charges, net revenue, percentage of net revenue on mean capital outlay, and area irrigated based on an average for the 10 years ending 1900-01. Particulars regarding each work as in the memorandum by the Inspector General of Irrigation, dated 7th May 1901. Form in which irrigation revenue is realised. Are the works credited with all the revenue to which they seem fairly entitled? Protective value of the works during recent years of drought.
3. *Proposed new Government works.*—Particulars regarding each work as in the memorandum by Inspector General of Irrigation, dated 7th May 1901. General statement of proposed new works showing for each the estimated capital cost, and financial result, and the area to be irrigated in each district. Possible scope for works other than those which have been proposed.
4. *Provincial works.*—Particulars as in paragraph 2 regarding any works for which Capital and Revenue accounts may be kept. List and brief description of works for which Capital and Revenue accounts are not kept; total expenditure incurred on such works; total receipts; areas irrigated and annual maintenance charges. Are the works credited with all the revenue to which they seem fairly entitled? Protective value of the works during recent years of drought. Expenditure on new Provincial works during the last 10 years. New Provincial works, if any, sanctioned or proposed. Extent to which Provincial revenues have been applied to the construction of new Provincial works and the limitation to such application. Does the Province get the whole of the increase of revenue due to the construction of such works? Have the present arrangements under the Provincial settlement the effect of encouraging or discouraging the application of Provincial revenues to works of irrigation? Is it desirable that Provincial

revenues should be devoted in future to the construction of such works or should all new works be constructed from Imperial funds? In what cases should new irrigation works be undertaken as a charge against Provincial funds?

5. *Private irrigation works other than wells.*—Brief description of such work (including field embankments), by whom constructed and controlled; state of repairs; their liability to failure in a year of drought; obstacles, if any, to their extension. Extent to which construction has been assisted by advances from Government. Concessions, if any, given to the constructors of such works. Obstacles to their extension and possibility of stimulating their construction in tracts liable to famine. Can new works of this kind be constructed without the permission of Government or without reference to their possible effect in intercepting the supply to either Government or private works?

6. *Wells.*—Districts or tracts in which well cultivation is most largely practised. Average depth of water below general surface in each district or tract; cost of wells used for irrigation; average area irrigated per well. Extent to which the supply of water is affected by drought. Concessions, if any, given to the constructors of new wells. Is it possible or desirable to stimulate the construction of new wells by more liberal advances or inducements?

7. *Black cotton soil.*—Where prevalent; usual depth; nature of the underlying stratum. Is there any desire for irrigation on the part of the cultivators of such soils? Extent to which the suitability of these soils for irrigation is affected by their depth, and by the facilities for natural drainage afforded by the stratum underlying them.

8. *Water-rates and distribution of water on Government works.*—Scale of water-rates on major and minor works. How is the distribution of water arranged for and controlled? Effect of years of favourable rainfall on the demand for irrigation, and on irrigation revenue.

9. *Loans for improvements.*—Total amount of loans advanced in each district under the Land Improvement and Agriculturists' Loans Act, respectively, and total amount of loans expended on works of irrigation during each of the past 10 years. Number of each works of class (wells, tanks, etc.) constructed, improved, or repaired by means of these advances.

10. *Programmes of relief works.*—Districts for which programmes have and have not been prepared. Procedure adopted in preparing the programmes, more especially as regards the selection of "village works" and other small works which are generally carried out by Civil Agency. Examination of programmes with special reference to the number of units and percentage of population provided for; the number of units requiring relief in the most severe famine on record; the distribution of the work over the district, and their utility. In tracts where drainage or flood embankment is more required than irrigation, information as to any projects of the kind which would be suitable for entry in the relief works programmes.